Alon USA, LP
Alon USA Big Spring Refinery

Howard County

Hazardous Waste Permit Application
IHW No. 50140
SWR No. 30083
RN100250869 / CN600881873

July 2024

Part B, Volume I

Alon USA, LP
Alon USA Big Spring Refinery – Big Spring, TX

Hazardous Waste Permit 50140
Part B Application
SWR No. 30083 / RN100250869 / CN600881783

SECTION I
GENERAL INFORMATION

Texas Commission on Environmental Quality
Industrial & Hazardous Waste Part B Permit Application

I. General Information

Provide all Part B responsive information in Appendix I. When preparing the physical format organize your submittal using the Format of Hazardous Waste permit Application and Instructions.

Provide responsive information in Appendix I.

a. Complete Table I - General Information

b. For all incoming New, Renewal, Class 3 Permit Modification, and Major Amendment applications, the TCEQ requires that a Core Data Form (CDF) be submitted whether or not a change has occurred in the previously submitted form.

   For Minor Amendment, Class 1, Class 1[1] , and Class 2 Permit Modification applications, the TCEQ requires that the CDF be only submitted if a change in any information in the previously submitted form has occurred at the time of the application submittal.

   For more information regarding the Core Data Form, call (512) 239 1575 or go to the TCEQ Web site at https://www.tceq.texas.gov/permitting/central_registry/guidance.html

c. Signature on Application

   It is the duty of the operator to submit an application for a permit. The person who signs the application form will often be the operator himself; when another person signs on behalf of the applicant, his title or relationship to the applicant will be shown. In all cases, the person signing the form must be authorized to do so by the applicant. An application submitted by a corporation must be signed by a responsible corporate officer such as a president, secretary, treasurer, vice president, or by his duly authorized representative, if such representative is responsible for the overall operation of the facility from which the activity described in the form originates. In the case of a partnership or a sole proprietorship, the application must be signed by a general partner or the proprietor, respectively. In the case of a municipal, state, federal, or other public facility, the application must be signed by a principal executive officer, a ranking elected official, or another duly authorized employee. A person signing an application on behalf of an applicant must provide notarized proof of authorization.

d. Complete Interim Status Land Disposal Unit(s) Certification, as applicable

e. Submit List and Map of Adjacent Landowners List, as applicable.

Alon USA, LP
Alon USA Big Spring Refinery
Big Spring, TX

Hazardous Waste Permit 50140 - Part B
Application SWR No. 30083 / RN100250869 / CN6001881783

APPENDIX I
APPLICATION RESPONSES
General Information

Alon USA, LP
Alon USA Big Spring Refinery
Big Spring, TX

Hazardous Waste Permit 50140 - Part B
Application SWR No. 30083 / RN100250869 / CN6001881783

APPENDIX I
GENERAL INFORMATION

Table I: General Information

A. Applicant: Facility Operator (or Facility Owner & Operator, if same)

Name[1]	Alon USA LP
Address	200 Refinery Road
City, State	Big Spring, TX
Zip Code	79720
Telephone Number	361-228-0996
Alternate Telephone Number	
Fax:	not applicable
TCEQ Solid Waste Registration No.	30083
EPA I.D. No.	TXD008013468
Permit No.	50140
County	Howard
Regulated Entity Name	Alon USA Big Spring Refinery
Regulated Entity Reference Number (RN)	RN100250869
Customer Name	Alon USA, LP
Customer Reference Number:	CN600881783
Charter Number[2]	13030010
Previous or Former Names of the Facility (if applicable)	Alon USA, LLC Big Spring Refinery

B. Facility Owner: Identify the Facility Owner if different than the Facility Operator[3]

☒ Same as Facility Operator?

Name	
Address	
City, State	
Zip Code	
Telephone Number	
Alternate Telephone Number	
Fax:	

C. Facility Contact

1. Persons or firms who will act as primary contact:

Name, Title:	Robert L. Sherrill, Regulatory Specialist
Address	13215 Bee Cave Parkway, Ste 230
City, State:	Austin, TX
Zip Code	78738
Telephone Number	512-470-8710
Alternate Telephone Number	
E-mail	[redacted]
Fax:	Not Applicable

Persons or firms who will act as primary contact (if more than one):

Name, Title:	Nishanth Singh, Environmental Engineer
Address	200 Refinery Road
City, State:	Big Spring, TX
Zip Code	79720-2173
Telephone Number	361-228-0996
Alternate Telephone Number	
E-mail	[redacted]
Fax:	

2. Agent in Service or Agent of Service (if you are an out-of-state company)[4]:

Name, Title:	Corporation Service Company
Address	211 East 7th Street, Ste 620
City, State:	Austin, TX
Zip Code	78701-3218

3. Individual responsible for causing notice to be published:

Name:	Robert L. Sherrill
Address	13215 Bee Cave Parkway, Ste 230
City, State:	Austin, TX
Zip Code	78738
Telephone Number	512-470-8710
Alternate Telephone Number	
E-mail	[redacted]
Fax:	Not Applicable

4. Public place in county where application will be made available[5]:

Name	Howard County Library

Address	500 South Main Street
City, State	Big Spring, TX
Zip Code	79720

D. Application Type and Facility Status

1. Application Type

☒ Permit	X Amendment	☐ Modification
☐ New	☐ Major	☐ Class 3
☐ Interim status	X Minor	☐ Class 2
☒ Renewal		☐ Class 1[1]
☐ RD&D		☐ Class 1
☐ Compliance Plan		

2. Part of a Consolidated Permit Processing request? [30 TAC Chapter 33] No

3. Does the application contain confidential material?[6] No

4. Facility Status. Check all that apply

☐ Proposed	☒ Existing
	☒ On-Site
	☐ Off-Site
	☐ Commercial
	☐ Recycle
	☒ Land Disposal
	☐ Areal or capacity expansion
	☒ Compliance plan

5. Is the facility within the Coastal Management Program boundary? **No**

6. Description of Application Changes

Complete Table I.1 - Description of Proposed Application Changes.

Note: List all changes requested in Table I.1. Unlisted requests risk remaining unaddressed or possibly denied if brought to the permit application reviewer's attention at a later time.

7. Total acreage of the facility being permitted: 5

8. Identify the name of the drainage basin and segment where the facility is located

River Segment Colorado River Below Lake J. B. Thomas

River Basin Colorado River Basin

E. Facility Siting Summary:

Is the facility located or proposed to be located:

1. Within a 100-year floodplain?	No
2. in wetlands?	No
3. In the critical habitat of an endangered species of plant or animal?	No
4. On the recharge zone of a sole-source aquifer?	No
5. In an area overlying a regional aquifer?	Yes
6. Within 0.5 mile (2,640 feet) of an established residence, church, school, day care center, surface water body used for a public drinking water supply, or dedicated public park?[7] [30 TAC 335.202] If Yes: the TCEQ shall not issue a permit for this facility.	No
7. In an area in which the governing body of the county or municipality has prohibited the processing or disposal of municipal hazardous waste or industrial solid waste? If Yes: provide a copy of the ordinance or order.	No

F. Wastewater and Stormwater Disposition

1. Is the disposal of any waste to be accomplished by a waste disposal well at this facility?	No
If Yes: List WDW Permit No(s):	
2. Will any point source discharge of effluent or rainfall runoff occur as a result of the proposed activities?	Yes

3. If Yes, is this discharge regulated by a TPDES or TCEQ permit?

☒ Yes

TCEQ Permit No. WQ00004539000

TPDES Permit No. WQ00001768000

☐ No

Date TCEQ discharge permit application filed

Date TPDES discharge permit application filed:

G. Information Required to Provide Notice

State Officials List [30 TAC 39]

Kevin Sparks, District 31
Historic Federal Bldg
620 South Taylor Street, Ste 203

State Senator	Amarillo, TX 79101 [redacted]
State Representative	Drew Darby 136 W. Twohig Avenue, STE E San Angelo, TX 76903 drew.darby@house.texas.gov
Local Officials List [30 TAC 39]	
Mayor	John Ratcliffe City Hall 310 Nolan Street Big Spring, TX 79720
Local Health Authority	Big Spring Public Health Center 501 Birdwell Lane, Ste 288 Big Spring, TX 79720
County Judge	Randy Johnson 300 Main Street Ste 207 Big Spring, TX 79720 [redacted] m
County Health Authority	Howard County Community Health Center 103 W 11th Street Big Spring, TX 79720
Based on the questions in the Bilingual Notice Instructions for this form, are you required to make alternate (Bilingual) notice for this application?	No
Bilingual Language(s):	
TCEQ Core Data Form Submitted?(see Section I Instructions, Item b.)	
Has any information changed on the TCEQ Core Data Form since the last submittal?	
Signature on Application Submitted? (see Section I Instructions, Item c)	

1. Individual, Corporation, or Other Legal Entity Name - must match the Secretary of State's database records for the Facility)
2. If the application is submitted on behalf of a corporation, please identify the Charter Number as recorded with the Office of the Secretary of State for Texas.
3. The operator has the duty to submit an application if the facility is owned by one person and operated by another [30 TAC 305.43(b)]. The permit will specify the operator and the owner who is listed on Part A of this application [Section 361.087, Texas Health and Safety Code].
4. If the application is submitted by a corporation or by a person residing out of state, the applicant must register an Agent in Service or Agent of Service with the Texas Secretary of State's office and provide a complete mailing address for the agent. The agent must be a Texas resident.
5. For applications for new permits, renewals, major amendments and Class 3 modifications a copy of the administratively complete application must be made available at a public place in the county where the facility is, or will be, located for review and copying by the public. Identify the public place in the county (e.g.,

public library, county court house, city hall), including the address, where the application will be made available for review and copying by the public.

6. For confidential information cross-reference the confidential material throughout the application to Section XIII: Confidential Material, and submit as a separate Section XIII document or binder conspicuously marked "CONFIDENTIAL".
7. Use only for a new commercial hazardous waste management facility or areal expansion of an existing commercial hazardous waste management facility or unit of that facility as defined in 30 TAC 335.202

Table I.1. - Description of Proposed Application Changes

Permit Compliance Plan Application appendix / Section	Brief Description of Proposed Change	Modification or Amendment Type	Supporting Regulatory Citation
Section I, Table 1, A	Facility Phone Number: 361-228-0996	1	TCEQ FIGURE 30 TAC §305.69(k), Item A. 1.
Section I, Table 1, C.1.	Change of address, email, phone number for Robert L. Sherrill	1	TCEQ FIGURE 30 TAC §305.69(k), Item A. 1.
Section I, Table 1, C.1.	Change of Contact and contact information to Nishanth Singh from Jimmy Miller	1	TCEQ FIGURE 30 TAC §305.69(k), Item A. 1.
Section I, Table 1, C.2.	Change of Agent in Service and contact information from CT Corporation to Corporation Service Company	1	TCEQ FIGURE 30 TAC §305.69(k), Item A. 1.
Section I, Table 1, C.3.	Change of name and contact information for individual responsible for causing notice to be published to Robert L. Sherrill from Robert DeOtte	1	TCEQ FIGURE 30 TAC §305.69(k), Item A. 1.
Section I, Table 1, F.3.	TCEQ Permit No. Changed to 4539000 fromTX0104515	1	TCEQ FIGURE 30 TAC §305.69(k), Item A. 1.
Section I, Table I Signature Page	Signator changed to Frank J. Burgard, III from Jimmy Crosby	1	TCEQ FIGURE 30 TAC §305.69(k), Item A. 1.

Section I, Table 1, G.	The renewal contact list and mailing lables were modified as follows: <u>Contacts Changed:</u> Tommy Duncan, Mayor Big Spring changed to Robert Moore Mark Barr, Howard County Judge changed to Kathryn Wiseman Irene Dominguez, ICHCP (County Health) changed to Texas Department of Health Howard County Services Kel Seliger, State Senitor changed to Kevin Sparks Randy Neugebauer, State Representative changed to Drew Darby <u>Contacts Added:</u> Midland Frac Oil Co. - neighboring land owner Texas Departmnet of Health Services, Environmental Operations Branch Dana LaGarde, Dirctor Texas Parks and Wildlife Department Wayne Christian, Chairman Texas Railroad Commission	1	TCEQ FIGURE 30 TAC §305.69(k), Item A. 1.
Section I, Core Data Form [#15]	address updated from Dallas, TX [Alon Corp.] to Big Spring, TX	1 [1]	TCEQ FIGURE 30 TAC §305.69(k), Item B.1.a.
Section I, Core Data Form [#39]	Updated with listings of all New Source Air Permit IDs, Stormwater Permit ID, Title V Air Permit ID, Wastewater Permits IDs, Emission Inventory ID, Pollution Prevention Planning ID, and Air Operatiing Permit ID	1 [1]	TCEQ FIGURE 30 TAC §305.69(k), Item B.1.a.
Appendix III.E. Contingency Plan	Section 1.2 - Primary and Alternate Emergency Coordinators names and contact information updated	1	TCEQ FIGURE 30 TAC §305.69(k), Item B.6.d.

Appendix III.E. Contingency Plan	Section 1.8.2 updated TNRCC Region 7 contact information to TCEQ Region 7 contact information	1	TCEQ FIGURE 30 TAC §305.69(k), Item B.6.d.
Appendix III.E. Contingency Plan	Section 1.8.3 updated TNRCC Region 7 contact information to TCEQ Region 7 contact information	1	TCEQ FIGURE 30 TAC §305.69(k), Item B.6.d.
Appendix III.E. Contingency Plan	Section 1.8.4 updated TNRCC Region 7 contact information to TCEQ Region 7 contact information	1	TCEQ FIGURE 30 TAC §305.69(k), Item B.6.d.
Appendix III.E. Contingency Plan	Table III.E-1, Updated description of wastes, none added	1	TCEQ FIGURE 30 TAC §305.69(k), Item B.6.d.
Appendix III.E. Contingency Plan	Table III.E-2, Updated updated all names and contact number for Emergency Response Personnel	1	TCEQ FIGURE 30 TAC §305.69(k), Item B.6.d.
Appendix III.E. Contingency Plan	Table III.E-3, Updated updated phone numbers for Emergency Contacts (Outside contacts)	1	TCEQ FIGURE 30 TAC §305.69(k), Item B.6.d.
Appendix III.E. Contingency Plan	Figure III.E-1, updated and clarified map of Emergency Equipment Locations	1	TCEQ FIGURE 30 TAC §305.69(k), Item A. 1.
Appendix III.E. Contingency Plan	Figure III.E-2, updated map of Primary Designated Assembly Locations for Evacuation	1	TCEQ FIGURE 30 TAC §305.69(k), Item A. 1.
Appendix III.B. Personnel Training PlanPlan	Table III.B-1, Updated description of wastes, none added	1	TCEQ FIGURE 30 TAC §305.69(k), Item B.5.b.
Attachment XI.D.3.c(1) Sample and Analysis Plan	Damaged Wells P&A'd and Replaced: ● MW-156 SE-ESC program P&A Feb-2017, replaced with MW-156R Mar-2017 ● MW-165, BICA program, P&A Feb-2019, replaced with MW-165R Jul-2017 ● MW-165A, BICA program, P&A Feb-2019, replaced with MW-165AR Jul-2017	1	TCEQ FIGURE 30 TAC §305.69(k), Item C.1.b.

TCEQ Use Only

TCEQ Core Data Form

For detailed instructions on completing this form, please read the Core Data Form Instructions or call 512-239-5175.

SECTION I: General Information

1. Reason for Submission *(If other is checked please describe in space provided.)*

☐ New Permit, Registration or Authorization (*Core Data Form should be submitted with the program application.)*

☒ Renewal *(Core Data Form should be submitted with the renewal form)* ☐ Other

2. Customer Reference Number *(if issued)*	Follow this link to search for CN or RN numbers in Central Registry**	3. Regulated Entity Reference Number *(if issued)*
CN 600881783		RN 100250869

SECTION II: Customer Information

4. General Customer Information | **5. Effective Date for Customer Information Updates** (mm/dd/yyyy) 08/12/2024

☐ New Customer ☐ Update to Customer Information ☐ Change in Regulated Entity Ownership
☐ Change in Legal Name (Verifiable with the Texas Secretary of State or Texas Comptroller of Public Accounts)

The Customer Name submitted here may be updated automatically based on what is current and active with the Texas Secretary of State (SOS) or Texas Comptroller of Public Accounts (CPA).

6. Customer Legal Name *(If an individual, print last name first: eg: Doe, John)* — *If new Customer, enter previous Customer below:*

Alon USA, LP

7. TX SOS/CPA Filing Number	8. TX State Tax ID (11 digits)	9. Federal Tax ID (9 digits)	10. DUNS Number *(if applicable)*
13030010	17528767449	752876744	039132774

11. Type of Customer: ☐ Corporation ☐ Individual Partnership: ☐ General ☒ Limited
Government: ☐ City ☐ County ☐ Federal ☐ Local ☐ State ☐ Other ☐ Sole Proprietorship ☒ Other: Organization

12. Number of Employees
☐ 0-20 ☐ 21-100 ☐ 101-250 ☐ 251-500 ☒ 501 and higher

13. Independently Owned and Operated?
☒ Yes ☐ No

14. Customer Role (Proposed or Actual) – *as it relates to the Regulated Entity listed on this form. Please check one of the following*

☐ Owner ☐ Operator ☒ Owner & Operator ☐ Other:
☐ Occupational Licensee ☐ Responsible Party ☐ VCP/BSA Applicant

15. Mailing Address: 200 Refinery Road, P.O. 1311

City	State	ZIP	ZIP + 4
BIG SPRING	TX	79720	2173

16. Country Mailing Information *(if outside USA)*	17. E-Mail Address *(if applicable)*
	[redacted]

18. Telephone Number	19. Extension or Code	20. Fax Number *(if applicable)*

(361) 228-0996		( ) -

SECTION III: Regulated Entity Information

21. General Regulated Entity Information *(If 'New Regulated Entity" is selected, a new permit application is also required.)*

☐ New Regulated Entity ☐ Update to Regulated Entity Name ☐ Update to Regulated Entity Information

The Regulated Entity Name submitted may be updated, in order to meet TCEQ Core Data Standards (removal of organizational endings such as Inc, LP, or LLC).

22. Regulated Entity Name *(Enter name of the site where the regulated action is taking place.)*

Alon USA Big Spring Refinery

23. Street Address of the Regulated Entity: ***(No PO Boxes)***	200 REFINERY ROAD							
	City	BIG SPRING	**State**	TX	**ZIP**	79720	**ZIP + 4**	2173
24. County	HOWARD							

If no Street Address is provided, fields 25-28 are required.

25. Description to Physical Location:	INTERSECTION OF I-20 & REFINERY ROAD				
26. Nearest City			**State**		**Nearest ZIP Code**

Latitude/Longitude are required and may be added/updated to meet TCEQ Core Data Standards. (Geocoding of the Physical Address may be used to supply coordinates where none have been provided or to gain accuracy).

27. Latitude (N) In Decimal:			**28. Longitude (W) In Decimal:**		
Degrees	Minutes	Seconds	Degrees	Minutes	Seconds
32	15	59	101	25	15

29. Primary SIC Code (4 digits)	**30. Secondary SIC Code** (4 digits)	**31. Primary NAICS Code** (5 or 6 digits)	**32. Secondary NAICS Code** (5 or 6 digits)
2911	2821	324110	

33. What is the Primary Business of this entity? *(Do not repeat the SIC or NAICS description.)*

PETROLEUM REFINERY

34. Mailing Address:	**200 REFINERY ROAD**							
	City	**BIG SPRING**	**State**	**TX**	**ZIP**	**79720**	**ZIP + 4**	**2173**
35. E-Mail Address:	[redacted]							

36. Telephone Number	**37. Extension or Code**	**38. Fax Number** *(if applicable)*
(512) 470-8710		( ) -

39. TCEQ Programs and ID Numbers Check all Programs and write in the permits/registration numbers that will be affected by the updates submitted on this form. See the Core Data Form instructions for additional guidance.

☐ Dam Safety	☐ Districts	☐ Edwards Aquifer	☒ Emissions Inventory Air	☒ Industrial Hazardous Waste
			HT0011Q	HW PERMIT CP-50140
☐ Municipal Solid Waste	☒ New Source Review Air	☐ OSSF	☐ Petroleum Storage Tank	☐ PWS
	PERMITS: 20487, 20628, 21013, 21392, 36845, 49154, 50209, 51A, 53425, 73323, 80833, AMOC47 REGISTRATION: 101913, 102218, 102238, 102241, 102252, 102255, 102256, 103142, 103145, 103154, 103156, 103158, 103160, 103162, 103164, 103166, 103186, 103187, 103188, 103189, 103190, 103191, 109237, 111025, 112751, 113295, 119374, 120041, 123201, 126155, 139413, 139891, 140037, 142563, 146112, 147050, 151418, 152183, 153255, 15407, 156312, 157674, 158321, 160102, 160786, 164514, 164523, 166594, 168554, 169517, 172284, 174254, 175823, 18782, 23836, 25233, 27065, 28979, 31834, 31904, 39184, 41916, 48115, 50028, 51700, 70204, 70215, 70658, 71018, 71293, 71774, 74005, 74448, 76223, 77393, 78556, 78640, 82085, 84775, 87417, 87851, 88517, 90993, 92136, 92615			
☐ Sludge	☒ Storm Water	☒ Title V Air	☐ Tires	☐ Used Oil
	TXR05FF84	O-1505		
☐ Voluntary Cleanup	☒ Wastewater	☐ Wastewater Agriculture	☐ Water Rights	☒ Other:
	2E0000032, WQ0001768000, WQ0004539000			Pollution Prevention Planning P00240, Air Operating Permit 1505

SECTION IV: Preparer Information

40. Name:	,ROBERT L. SHERRILL	41. Title:	REGULATORY SPECIALIST

42. Telephone Number	43. Ext./Code	44. Fax Number	45. E-Mail Address
(512) 470-8710		( ) -	[redacted]

SECTION V: Authorized Signature

46. By my signature below, I certify, to the best of my knowledge, that the information provided in this form is true and complete, and that I have signature authority to submit this form on behalf of the entity specified in Section II, Field 6 and/or as required for the updates to the ID numbers identified in field 39.

Company:	Alon USA, L.P.	Job Title:	Senior Manager, Environmental
Name *(In Print)*:	Frank J. Burgard, III	Phone:	(432) 466- 4632
Signature:	Frank J Burgard III	Date:	9/17/2024

Signature Page

I, Frank J Burgard III, Sr. Manager, Environmental,
(Operator) *(Title)*

certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signature: Frank J Burgard III Date: 6/16/2025

To be completed by the Operator if the application is signed by an Authorized Representative for the Operator

I, _____, hereby designate _____
[Print or Type Name] *[Print or Type Name]*

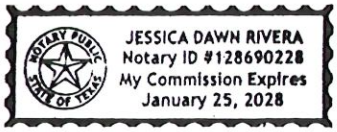
as my representative and hereby authorize said representative to sign any application, submit additional information as may be requested by the Commission; and/or appear for me at any hearing or before the Texas Commission on Environmental Quality in conjunction with this request for a Texas Water Code or Texas Solid Waste Disposal Act permit. I further understand that I am responsible for the contents of this application, for oral statements given by my authorized representative in support of the application, and for compliance with the terms and conditions of any permit which might be issued based upon this application.

_____
Printed or Typed Name of Operator or Principal Executive Officer

_____
Signature

SUBSCRIBED AND SWORN to before me by the said
On this 16th day of June, 2025
My commission expires on the 25th day of January, 2028

Notary Public in and for Howard County, Texas
*[**Note**: Application Must Bear Signature & Seal of Notary Public]*



HOWARD COUNTY
PO BOX 1949
BIG SPRING, TX 79721-1949

JAMES MANLEY DENTON
4510 SPOTTED OAK WOODS
SAN ANTONIO, TX 78249-1437

RONALD & SHERRY WHITE
3214 FENN STREET
BIG SPRING, TX 79720-3500

R-DIRT COMPANY LLC, DBA RED DIRT
PO BOX 2395
BIG SPRING, TX 79721-2395

NP JOHNSON FAMILY LTD PARTNERSHIP
326 HWY 6
SALEM, UT 84653-5620

BRANDIE JETTON
303 S. MIDWAY RD.
BIG SPRING, TX 79720-0813

SCOTT KLARER
700 N. LANCASTER STREET
BIG SPRING, TX 79720-1211

ROBERT M. HENSON, DBA HENSON
WRECKING 6901 E. MIDWAY RD.
BIG SPRING, TX 79720-0988

POWER RESOURCES INC.
400 W 15TH STREET, STE 700
AUSTIN, TX 78701-1647

R.E. & BEVERLY SMITHIE
5011 E. MIDWAY RD.
BIG SPRING, TX 79720-0603

SID RICHARDSON, CARBON LTD
PO BOX 870849
MESQUITE, TX 75187-0849

HYDRO DYNAMICS INC.
4312 S. HWY. 87
BIG SPRING, TX 79728-7973

CITY OF BIG SPRING
310 NOLAN
BIG SPRING, TX 79720-2657

KENT BENNETT
8611 KENOSHA DR.
LUBBOCK, TX 79423-2728

I.E.O. UNION, LOCAL #826
111 E. COOLIDGE ST.
BIG SPRING, TX 79007-5425

NOLA-B CORPORATION
PO BOX 14496
ODESSA, TX 79768-4496

MIDLAND FRAC OIL CO.
3 RIVERWAY, SUITE 1930
HOUSTON, TX 77056-1978

TOMMY WILLIAMS
12 MEADOW BROOK RD.
BIG SPRING, TX 79720-0522

LAZY J, LTD
PO BOX 789
BIG SPRING, TX 79721-0789

LINDA CALDWELL, AARON & JAMES TUCKER
2216 BRADFORD CT.
MIDLAND, TX 79705-1729

RANDY PAIGE
5402 SERVICE RD.
BIG SPRING, TX 79720-1065

RONALD T. GENN
PO BOX 251
DEPEW, OK 74028-0251

JACK CATHEY CONSTRUCTION CO., INC.
2727 E. 25TH ST.
BIG SPRING, TX 79720-6143

TOMMY GAGE
2500 ALLENDALE
BIG SPRING, TX 79720-6008

CACTUS PAINT MANUFACTURING
PO BOX 1047
BIG SPRING, TX 79720-1047

ONCOR ELECTRIC DELIVERY COMPANY
PO BOX 219071
DALLAS, TX 75221-9071

HP KIRCHNER III
4608 COUNTY ROAD 082
JASPER, TX 75951-7039

ELSIE JEAN NEILL
501 CORBELL
BIG SPRING, TX 79720-3543

VIRGINIA ERSKINE
705 HOSLEY DR.
NOBLE, OK 73068-8235

CLYDE MCMAHON
19 VILLAGE RD.
BIG SPRING, TX 79720-6545

HONORABLE ROBERT MOORE,
MAYOR, CITY OF BIG SPRING
310 NOLAN STREET
BIG SPRING, TX 79720

HONORABLE KATHRYN WISEMAN
HOWARD COUNTY JUDGE
312 SCURRY STREET
BIG SPRING, TX 79720

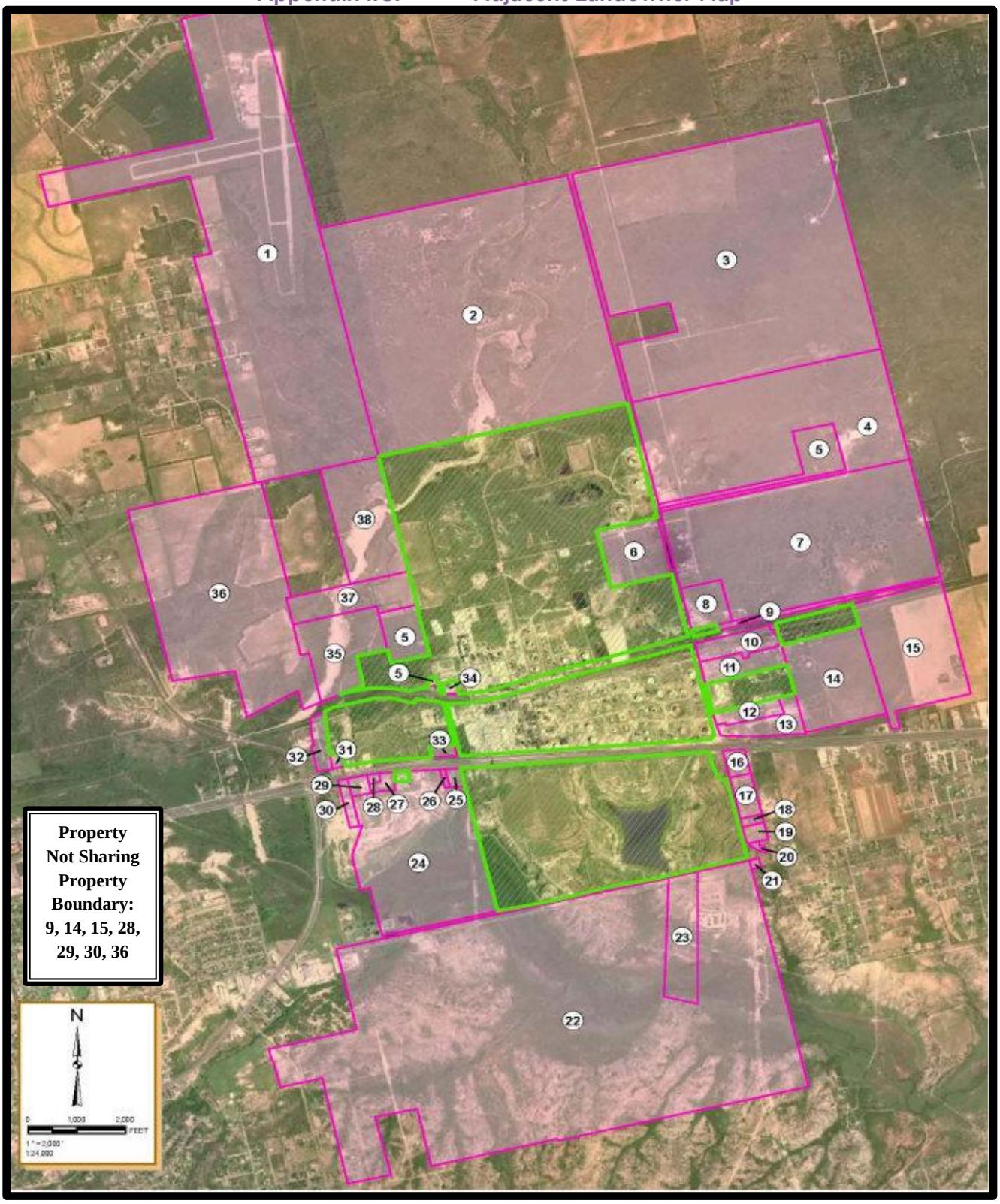
DANA LAGARDE, DIRECTOR
TEXAS PARKS AND WILDLIFE
DEPARTMENT
4200 SMITH SCHOOL ROAD
AUSTIN, TX 78744

TEXAS DEPARTMENT OF HEALTH
SERVICES
HOWARD COUNTY
501 BIRDWELL LANE 28 E
BIG SPRING, TX 79920

TEXAS DEPARTMENT OF HEALTH SERVICES
ENVIRONMENTAL OPERATIONS BRANCH
P.O. BOX 149347, MAIL CODE 2835
AUSTIN, TX 78714

WAYNE CHRISTIAN, CHAIRMAN
TEXAS RAILROAD COMMISSION
1701 N CONGRESS
AUSTIN, TX 78701

NISHANTH SINGH, ENVIRONMENTAL
ALON BIG SPRING REFINERY
P.O. BOX 1311
BIG SPRING, TX 79721



Source: Howard County Appraisal District Tax Map & Faxed Appraisal Cards
GREEN – Facility Property, **PINK** – Adjacent Landowners

Part B Application Key To Adjacent Landowner Map
Appendix I.G.

Map ID	Owner	Address of Record	City, Zip Code
1	Howard County	PO Box 1949	Big Spring, TX 79721
2	Ronald & Sherry White	3214 Fenn Street	Big Spring, TX 79720-3500
3	NP Johnson Family LTD Partnership	326 Hwy 6	Salem, UT 84653-5620
4	Scott Klarer	700 N. Lancaster Street	Big Spring, TX 79720-1211
5	Power Resources Inc.	400 W 15th Street, Ste 700	Austin, TX 78701-1647
6	Sid Richardson, Carbon LTD	PO Box 870849	Mesquite, TX 75187-0849
7	Moore Development Big Spring	PO Box 3359	Big Spring, TX 79721-3359
8	Ronald T. Genn	PO Box 251	Depew, OK 74028-0251
10	Kent Bennett	8611 Kenosha Drive	Lubbock, TX 79423-2728
11	Midland Frac Oil Co.	3 Riverway, Suite 1930	Houston, TX 77056-1978
12	NOLA-B Corporation	PO Box 14496	Odessa, TX 79768-4496
13	Randy Paige	5402 Service Rd.	Big Spring, TX 79720-1065
16	James Manley Denton	4510 Spotted Oak Woods	San Antonio, TX 78249-1437
17	R-Dirt Company LLC, DBA Red Dirt	PO Box 2395	Big Spring, TX 79721-2395
18	Brandie Jetton	303 S. Midway Rd.	Big Spring, TX 79720-0813
19	Robert M. Henson, DBA Henson Wrecking .	6901 E. Midway Rd	Big Spring, TX 79720-0988
20	R.E. & Beverly Smithie	5011 E. Midway Rd.	Big Spring, TX 79720-0603
21	Hydro Dynamics Inc.	4312 S. Hwy. 87	Big Spring, TX 79728-7973
22	Lazy J, LTD	PO Box 789	Big Spring, TX 79721-0789
23	Jack Cathey Construction Co., Inc.	2727 E. 25th St.	Big Spring, TX 79720-6143
24	City of Big Spring	310 Nolan	Big Spring, TX 79720-2657
25	International Union of Oper. Engineers, Local #826	111 E. Coolidge St.	Big Spring, TX 79007-5425
26	Tommy Williams	12 Meadow Brook Rd.	Big Spring, TX 79720-0522
27	Linda Caldwell, Aaron & James Tucker	2216 Bradford Ct.	Midland, TX 79705-1729
31	Tommy Gage	2500 Allendale	Big Spring, TX 79720-6008
32	Clyde McMahon	19 Village Rd.	Big Spring, TX 79720-6545
33	Cactus Paint Manufacturing	PO Box 1047	Big Spring, TX 79720-1047
34	Oncor Electric Delivery Company	PO Box 219071	Dallas, TX 75221-9071
35	HP Kirchner III	4608 County Road 082	Jasper, TX 75951-7039
37	Elsie Jean Neill	501 Corbell	Big Spring, TX 79720-3543
38	Virginia Erskine	705 Hosley Drive	Noble, OK 73068-8235

Alon USA, LP
Alon USA Big Spring Refinery
Big Spring, TX

Hazardous Waste Permit 50140
Part B Application
SWR No. 30083 / RN100250869 / CN600881783

SECTION II
FACILITY SITING CRITERIA

II. Facility Siting Criteria

Provide all Part B responsive information in Appendix II. When preparing the physical format organize your submittal using the Format of Hazardous Waste permit Application and Instructions.

For all new hazardous waste management facilities or areal expansions of existing hazardous waste management facilities provide a report which includes all applicable information regarding Unsuitable Site Characteristics found in 30 TAC Chapter 335, Subchapter G. The report must address each requirement applicable to the type of activity submitted in the application. Reference specific rule numbers whenever possible. Supporting information may be cross-referenced to other parts of this application such as Section V - Engineering Report or Section VI - Geology Report, but information submitted in previous applications must be fully reproduced herein. In addition, provide the information in Table II, as applicable.

For permit renewals provide a report which includes all applicable information regarding Unsuitable Site Characteristics found in 30 TAC Chapter 335, Subchapter G. In addition, provide the information in Table II, as applicable. The applicant may resubmit the information submitted with the original permit application provided this information has not changed. For a renewal this information is necessary to ensure a complete application is received.

For capacity expansions of existing facilities, please provide information in Table II, as applicable. Please note however, that additional technical information may be requested to address any facility siting characteristics noted in Table I, under Facility Siting Summary.

> **NOTE:** The standards contained in §335.204(a)(6) - (9), (b)(7) - (12), (c)(6) - (11), (d)(6) - (11), and (e) (8) - (13) are not applicable to facilities that have submitted a notice of intent to file a permit application pursuant to §335.391 of this title (relating to Pre-Application Review) prior to May 3, 1988, or to facilities that have filed permit applications pursuant to §335.2(a) of this title which were submitted in accordance with Chapter 305 of this title and that were declared to be administratively complete pursuant to §281.3 of this title (relating to Initial Review) prior to May 3, 1988.[30 TAC 335.201(b)]

A. Requirements for Storage or Processing Facilities, Land Treatment Facilities, Waste Piles, Storage Surface Impoundments, and Landfills.

   Complete Table II.A-Requirements for Storage or Processing Facilities, Land Treatment Facilities, Waste Piles, Storage Surface Impoundments, and Landfills.

B. Additional Requirements for Land Treatment Facilities [30 TAC 335.204(b)]

   Complete Table II.B.-Additional Requirements for Land Treatment Facilities [30 TAC 335.204(b)

C. Additional Requirements for Waste Piles [30 TAC 335.204(c)]

   RESERVED

D. Additional Requirements for Storage Surface Impoundments [30 TAC 335.204(d)]

   RESERVED

E. Additional Requirements for Landfills (and Surface Impoundments Closed as Landfills with wastes in place)

RESERVED

F. Flooding

1. Identify whether the facility is located within a 100-year flood plain [40 CFR 270.14(b)(11)(iii)]. This identification must indicate the source of data for such determination and include a copy of relevant documentation (e.g., flood maps, if used and/or calculations). The boundaries of the hazardous waste management facility must be shown on the flood plain map. If the facility is not subject to inundation as a result of a 100-year flood event, indicate that the facility is not within the 100-year flood plain, and do not complete the remainder of the Flooding section in Table II. An applicant for a proposed hazardous waste landfill, areal expansion of a hazardous waste landfill, or a commercial hazardous waste land disposal unit may not rely solely on flood plain maps prepared by the Federal Emergency Management Agency (FEMA) or a successor agency for this determination.

2. If the facility is located within the 100-year flood plain the applicant must provide information detailing the specific flooding levels and other events (e.g., Design Hurricane projected by Corps of Engineers) which impact the flood protection of the facility. Information shall also be provided identifying the 100-year flood level and any other special flooding factors (e.g., wave action) which must be considered in designing, construction, operating, or maintaining the facility to withstand washout from a 100-year flood.

3. State whether any flood protection devices exist at the facility (e.g., flood walls, dikes, etc.), designed to prevent washout from the 100-year flood.

   a. If Yes: provide in Section V an engineering analysis to indicate the various hydrodynamic and hydrostatic forces expected to result at the facility as a consequence of a 100-year flood. [40 CFR 270.14(b)(11)(iv)(A)]

   Include structural or other engineering studies showing the design of operational units (e.g., tanks, incinerators) and flood protection devices (e.g., flood walls, dikes) at the facility and how these will prevent washout. [40 CFR 270.14(b)(11)(iv)(B)]

   b. If No: the applicant shall provide in Section V a plan for constructing flood protection devices and a schedule including specific time frames for completion. Provide engineering analyses to indicate the various hydrodynamic and hydrostatic forces expected to result at the facility as a consequence of a 100-year flood. [40 CFR 270.14(b)(11)(iv)(A)]

   Include structural or other engineering studies showing the design of operational units (e.g., tanks, incinerators) and flood protection devices (e.g., flood walls, dikes) at the facility and how these will prevent washout. [40 CFR 270.14(b)(11)(iv)(B)]

4. If applicable, and in lieu of the flood protection devices from above, provide a detailed description of the procedures to be followed to remove hazardous waste to safety before the facility is flooded. [40 CFR 270.14(b)(11)(iv)(c)] The procedures should include:

a. Timing of such movement relative of flood levels, including estimated time to move the waste, to show that such movement can be completed before flood waters reach the facility. Indicate which specific events shall be use to begin waste movement (e.g., Hurricane warning, Flash Flood watch, etc.);

b. A description of the location(s) to which the waste will be moved and a demonstration that these facilities will be eligible to receive hazardous waste in accordance with appropriate regulations (i.e., a permitted facility);

c. The planned procedures, equipment, and personnel to be used and the means to ensure that such resources will be available in time for use; and

d. The potential for accidental discharges of the waste during movement and precautions taken to preclude accidental discharges.

G. Additional Information Requirements

1. For a new hazardous waste management facility, include a map of relevant local land-use plans and descriptions of the major routes of travel in the vicinity of the facility to be used for the transportation of hazardous waste to and from the facility covering at least a five (5)-mile radius from the boundaries of the facility. [30 TAC 305.50(a)(10)(A)&(D)]

2. For a new commercial hazardous waste management facility as defined in 30 TAC 335.202 or the subsequent areal expansion of such a facility or unit of that facility, indicate on the map the nearest established residence, church, school, day care center, surface water body used for a public drinking water supply, and dedicated public park.

3. For new commercial hazardous waste management facilities, submit the following: [30 TAC 305.50(a)(12)(A)]-

   RESERVED

4. Include the names and locations of industrial and other waste-generating facilities within 0.5 miles for a new on-site hazardous waste management facility and the approximate quantity of hazardous waste generated or received annually at those facilities. [30 TAC 305.50(a)(10)(B)&(C)]

5. Include the names and locations of industrial and other waste-generating facilities within 1.0 miles for a new commercial hazardous waste management facility and the approximate quantity of hazardous waste generated or received annually at those facilities. [30 TAC 305.50(a)(10)(B)&(C)]

6. For existing land disposal facility units provide documentation that the information required by 30 TAC 335.5 has been placed in the county deed records. If previously submitted, please reference the submittal by date and registration number.

7. If a surface impoundment or landfill (including post-closure) is to be permitted, provide exposure information to accompany this application and in accordance with 30 TAC 305.50(a)(8) and 40 CFR 270.10(j). This information will be considered separately from the TCEQ application completeness determination.

8. For a hazardous waste management facility requesting a capacity expansion of an existing hazardous waste management facility, please provide in Section VI.A.1.a the requested fault delineation information. [30 TAC 305.50(a)(4)(D)]

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APPENDIX II
APPLICATION RESPONSES
Facility Siting Criteria

Table II

Table II contains the following: Table II.A, Table II.B, Table II.C, Table II.D, Table II.E and Flooding from Section II. F of the Part B Application

Table II.A - Requirements for Storage or Processing Facilities, Land Treatment Facilities, Waste Piles, Storage Surface Impoundments, and Landfills

Is the facility located or proposed to be located[1]:

In wetlands? [as applicable: 30 TAC 335.204(a)(2), (b)(2), (c)(2), (d)(2), and/or (e)(2)	No
If Yes: the TCEQ shall not issue a permit for a new hazardous waste management facility or areal expansion of an existing facility into wetlands, pursuant to 30 TAC 335.205(a)(1).	
In the critical habitat of an endangered species of plant or animal?[6] [as applicable: 30 TAC 335.204(a)(8), (b)(10), (c)(9), (d)(9), and/or (e)(11)]	No
If Yes: submit in Section V information demonstrating that design, construction, and operational features will prevent adverse effects on such critical habitat.	
On the recharge zone of a sole-source aquifer?2 [30 TAC 335.204(a)(3), (b)(3), (c)(3), (d)(3), and/or (e)(3)]	No
If Yes: then for storage and processing facilities (excluding storage surface impoundments), submit in Section V information demonstrating that secondary containment is provided to preclude migration to groundwater from spills, leaks, or discharges.	
In an area overlying a regional aquifer? [as applicable: 30 TAC 335.204(a)(4), (b)(4), (c)(4), (d)(4), and/or (e)(4)]	Yes, See Below
If Yes: submit site-specific information in Section V and/or Section VI demonstrating compliance with 30 TAC 335.205(a)(1).	
In areas where soil unit(s) are within five feet of the containment structure, or treatment zone, as applicable, that have a Unified Soil Classification of GW, GP, GM, GC, SW, SP, or SM, or a hydraulic conductivity greater than 10-5 cm/sec? [as applicable: 30 TAC 335.204(a)(5), (b)(5), (c)(5), (d)(5), and/or (e)(5)]	No
If Yes: provide additional information in Sections V and/or Section VI demonstrating compliance with 30 TAC 335.205(a)(1)	
In areas of direct drainage within one mile of a lake at its maximum conservation pool level, if the lake is used to supply public drinking water through a public water system?[6] [as applicable: 30 TAC 335.204 (a)(6), (b)(7), (c)(6), and/or (e)(8)].	No
If Yes: provide information in Section V demonstrating compliance with 30 TAC 335.205(a)(1).	

In areas of active geologic processes, including but not limited to erosion, submergence, subsidence, faulting, karst formation, flooding in alluvial flood wash zones, meandering river bank cuttings, or earthquakes?[6] [as applicable: 30 TAC 335.204(a)(7), (b)(8) ,(c)(7), (d)(7), and/ or (e)(9)]	No
Within 30 feet of the upthrown side or 50 feet of the downthrown side of the actual or inferred surface expression of a fault that has reasonably been shown to have caused displacement of shallow Quaternary sediments or of man-made structures?[6] [as applicable: 30 TAC 335.204(a)(9), (b)(12) ,(c)(11), (d)(11), and/or (e)(13)]	No

If Yes: specify in Section V the design, construction, and operational features that will prevent adverse effects resulting from any fault movement.

If a fault is found to be present, the width and location of the actual or inferred surface expression of the fault, including both the identified zone of deformation and the combined uncertainties in locating a fault trace, must be determined by a qualified geologist or geotechnical engineer and reported in Section VI.

Table II.B. - Additional Requirements for Land Treatment Facilities [30 TAC 335.204(b)]:

Is the land treatment facility located or proposed to be located:

Within 1000 feet of an established residence, church, school, day care center, surface water body used for a public drinking water supply, or dedicated public park which is in use at the time the notice of intent to file a permit application is filed with the commission, or which is in use at the time the permit application is filed with the commission?	No
If Yes: the TCEQ shall not issue a permit for a new hazardous waste land treatment unit or an areal expansion of an existing land treatment unit, pursuant to 30 TAC 335.204(b)(6) and 335.205(a).	
Within 1000 feet of an area subject to active coastal shoreline erosion even though the area is protected by a barrier island or peninsula?	No
If Yes: submit in Section V.F design, construction, and operational features which will prevent adverse effects resulting from storm surge and erosion or scouring by water.	
Within 5000 feet of a coastal shoreline subject to active shoreline erosion and which is unprotected by a barrier island or peninsula.	No
If Yes: submit Section V.F design, construction and operational features, which will prevent adverse effects resulting from storm surge and erosion or scouring by water.	
On a barrier island or peninsula?	No
If Yes: the TCEQ shall not issue a permit for a new hazardous waste land treatment unit or an areal expansion of an existing land treatment unit, pursuant to 30 TAC 335.204(b)(11) and 335.205(a)(1).	

Table II.C. - Additional Requirements for Waste Piles [30 TAC 335.204(c)]

Is the waste pile located or proposed to be located:

Within 1000 feet of an area subject to active coastal shoreline erosion even though the area is protected by a barrier island or peninsula?
If Yes: submit in Section V.E design, construction, and operational features on the facility which will prevent adverse effects resulting from storm surge and erosion or scouring by water.
Within 5000 feet of a coastal shoreline subject to active shoreline erosion and which is unprotected by a barrier island or peninsula.
If Yes: submit Section V.E design, construction, and operational features which will prevent adverse effects resulting from storm surge and erosion or scouring by water.
On a barrier island or peninsula?[6]
If Yes: the TCEQ shall not issue a permit for a new hazardous waste pile or an areal expansion of an existing waste pile, pursuant to 30 TAC 335.204(c)(10) and 335.205(a)(1).

Table II.D. - Additional Requirements for Storage Surface Impoundments [30 TAC 335.204(d)]

Is the land treatment facility located or proposed to be located:

Within 1000 feet of an area of active coastal shoreline erosion even though the area is protected by a barrier island or peninsula	No
If Yes: submit in Section V.D design, construction, and operational features of the facility which will prevent adverse effects resulting from storm surge and erosion or scouring by water.	
Within 5000 feet of a coastal shoreline subject to active shoreline erosion and which is unprotected by a barrier island or peninsula.	No
If Yes: then submit in Section V.D design, construction, and operational features which will prevent adverse effects resulting from storm surge and erosion or scouring by water.	
On a barrier island or peninsula?[6]	No
If Yes: the TCEQ shall not issue a permit for a new hazardous waste storage surface impoundment or an areal expansion of an existing storage surface impoundment, pursuant to 30 TAC 335.204(d)(10) and 335.205(a)(1).	

Table II.E. - Additional Requirements for Landfills (and Surface Impoundments Closed as Landfills with wastes in place)

Is the landfill located or proposed to be located:

Within 1000 feet of an established residence, church, school, day care center, surface water body used for a public drinking water supply, or dedicated public park which is in use at the time the notice of intent to file a permit application is filed with the commission, or which is in use at the time the permit application is filed with the commission?
If Yes: the TCEQ shall not issue a permit for a new hazardous waste landfill or an areal expansion of an existing landfill, pursuant to 30 TAC 335.204(e)(6) and 335.205(a)(1).
(For commercial hazardous waste landfills) in the 100-year flood plain of a perennial stream that is delineated on a flood map adopted by the Federal Emergency Management Agency after September 1, 1985, as zone A1-99, VO, or V1-30?
If Yes: the TCEQ shall not issue a permit for a new hazardous waste landfill or an areal expansion of an existing landfill, pursuant to 30 TAC 335.204(e)(7) and 335.205(a)(1).
Within 1000 feet of an area subject to active coastal shoreline erosion even though the area is protected by a barrier island or peninsula?
If Yes: then submit in Section V.G design, construction, and operational features which will prevent adverse effects resulting from storm surge and erosion or scouring by water.
Within 5000 feet of a coastal shoreline subject to active shoreline erosion and which is unprotected by a barriers island or peninsula.
If Yes: then submit in Section V.G design, construction, and operational features which will prevent adverse effects resulting from storm surge and erosion or scouring by water.
On a barrier island or peninsula?
If Yes: the TCEQ shall not issue a permit for a new hazardous waste landfill or an areal expansion of an existing landfill, pursuant to 30 TAC 335.204(e)(12) and 335.205(a)(1).

Flooding (see Section II Instructions, Item F)

Is the facility within a 100-year flood plain?	No
Has a flood plain map been provided?	Yes
Has information about flooding levels and events, and other special flooding factors, been provided?[3]	No
Do any flood protection devices exist at the facility (e.g., flood walls, dikes, etc.) designed to prevent washout from the 100-year flood?[3]	No, See Below
If Yes: provide in Section V an engineering analysis to indicate the various hydrodynamic and hydrostatic forces expected to result at the facility as a consequence of a 100-year flood. [40 CFR 270.14(b)(11)(iv)(A)][4]	
If No: the applicant shall provide in Section V a plan for constructing flood protection devices and a schedule including specific time frames for completion. Provide engineering analyses to indicate the various hydrodynamic and hydrostatic forces expected to result at the facility as a consequence of a 100-year flood. [40 CFR 270.14(b)(11)(iv)(A)][5]	
If applicable, and in lieu of the flood protection devices from above, was a detailed description of the procedures to be followed to remove hazardous waste to safety before the facility is flooded provided?[3, 6]	Not Applicable
Additional Information Requirements (see Section II instructions, Item G): Submitted?	

1. Provide the source of information for all questions in the appendix.
2. Note: Land treatment facilities, waste piles, storage surface impoundments, and landfills may not be located on the recharge zone of a sole-source aquifer.
3. Only required to be submitted if the facility is subject to inundation as a result of a 100-year flood event.
4. Include structural or other engineering studies showing the design of operational units (e.g., tanks, incinerators) and flood protection devices (e.g., flood walls, dikes) at the facility and how these will prevent washout. [40 CFR 270.14(b)(11)(iv)(B)]
5. Include structural or other engineering studies showing the design of operational units (e.g., tanks, incinerators) and flood protection devices (e.g., flood walls, dikes) at the facility and how these will prevent washout. [40 CFR 270.14(b)(11)(iv)(B)]
6. The standards contained in §335.204(a)(6) - (9), (b)(7) - (12), (c)(6) - (11), (d)(6) - (11), and (e) (8) - (13) are not applicable to facilities that have submitted a notice of intent to file a permit application pursuant to §335.391 of this title (relating to Pre-Application Review) prior to May 3, 1988, or to facilities that have filed permit applications pursuant to §335.2(a) of this title which were submitted in accordance with Chapter 305 of this title and that were declared to be administratively complete pursuant to §281.3 of this title (relating to Initial Review) prior to May 3, 1988.[30 TAC 335.201(b)]

Alon USA, LP
Alon USA Big Spring Refinery
Big Spring, TX

Hazardous Waste Permit 50140 - Part B
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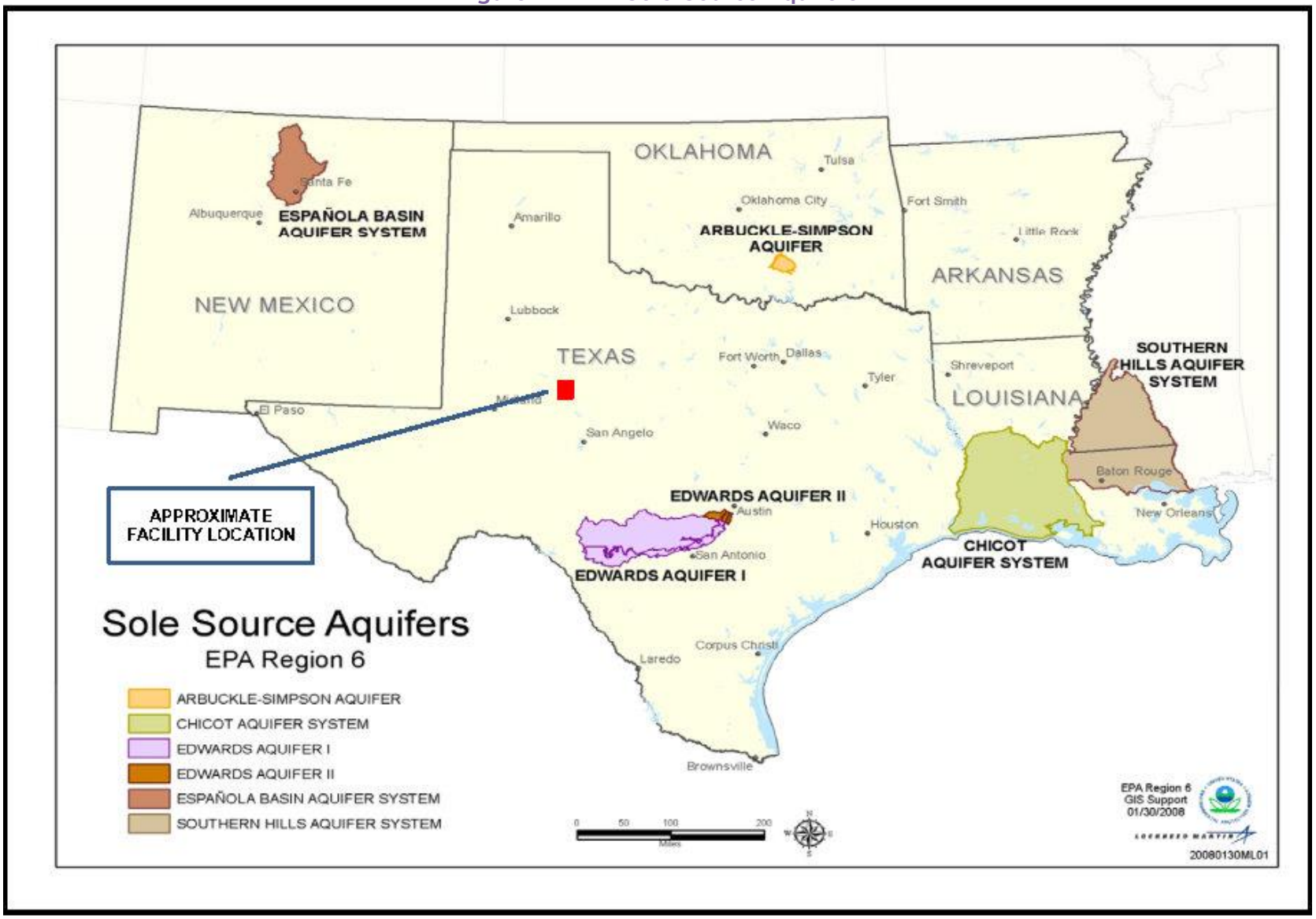
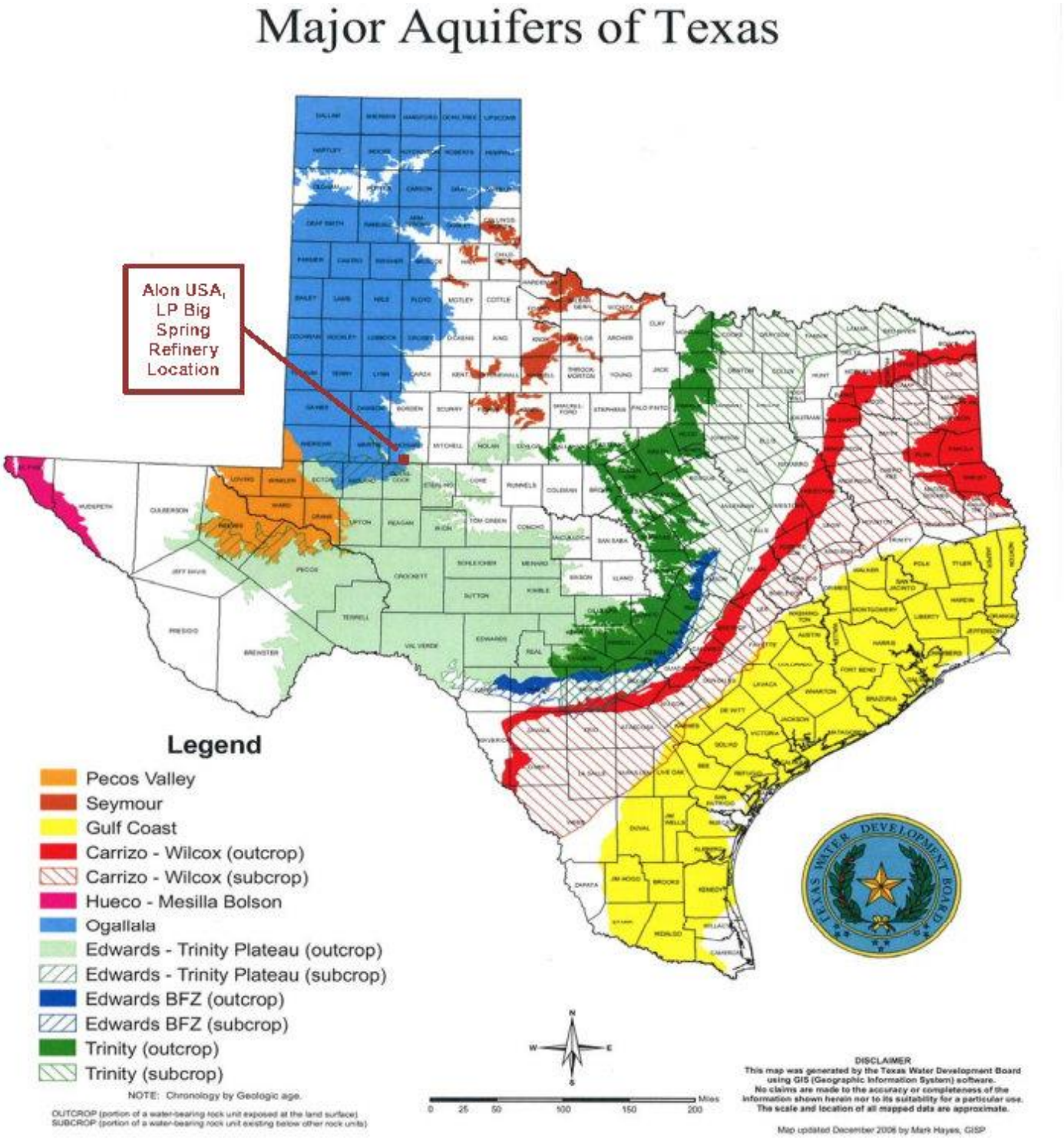
APPENDIX II
FIGURES

Figure II.A.1. Sole-Source Aquifers



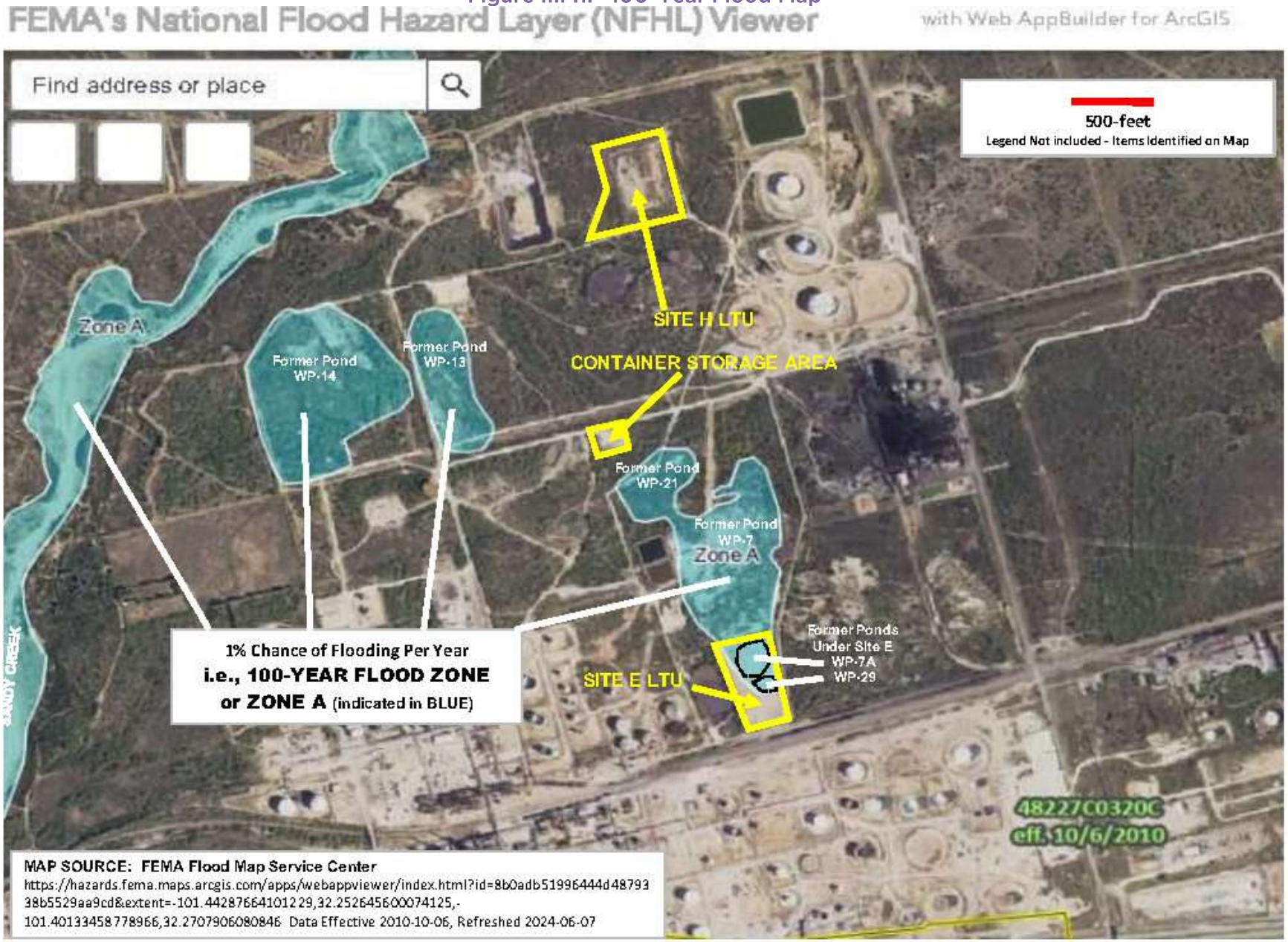
Source: EPA Region 6 Website https://housingnm.org/uploads/documents/EPA_Region_6_Sole_Source_Aquifers.pdf

Figure II.A.2. Major Regional Aquifer Map with Location



Source: Texas Water Development Board website https://www.twdb.texas.gov/groundwater/aquifer/major.asp

Figure II.F.1. 100-Year Flood Map



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APPENDIX II
ATTACHMENT II.G.6.
DEED RECORDS

SITE E

Being a 8.09 Acre Tract of land out of the South part of Section 38 and the North part of Section 47, Block 32, T-1-N, T. & P. RR. Co. Survey, Howard County, Texas, and being more particularly described by metes and bounds as follows:

Beginning at a 120-D nail in Section 38, for the NE corner of this Site from whence a RR spike, the SW corner of Section 37, the NW corner of Section 48, the NE corner of said Section 47, and the SE corner of said Section 38, Block 32, T-1-N, T. & P. RR. Co. Survey, Howard County, Texas, bears S 86°49'07" E 1906.59'

Thence S 7°50'35" E at 567.13' pass the South line of Section 38 and the North line of Section 47, 797.42' in all to a 120-D nail for the SE corner of this Site

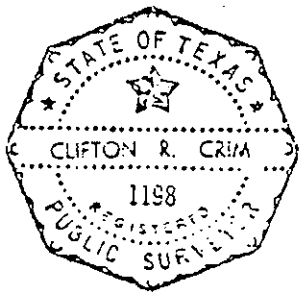
Thence S 73°31'15" W 352.68' to a 120-D nail for the SE corner of a 3.99 Acre Tract (Site F), and the SW corner of this Site

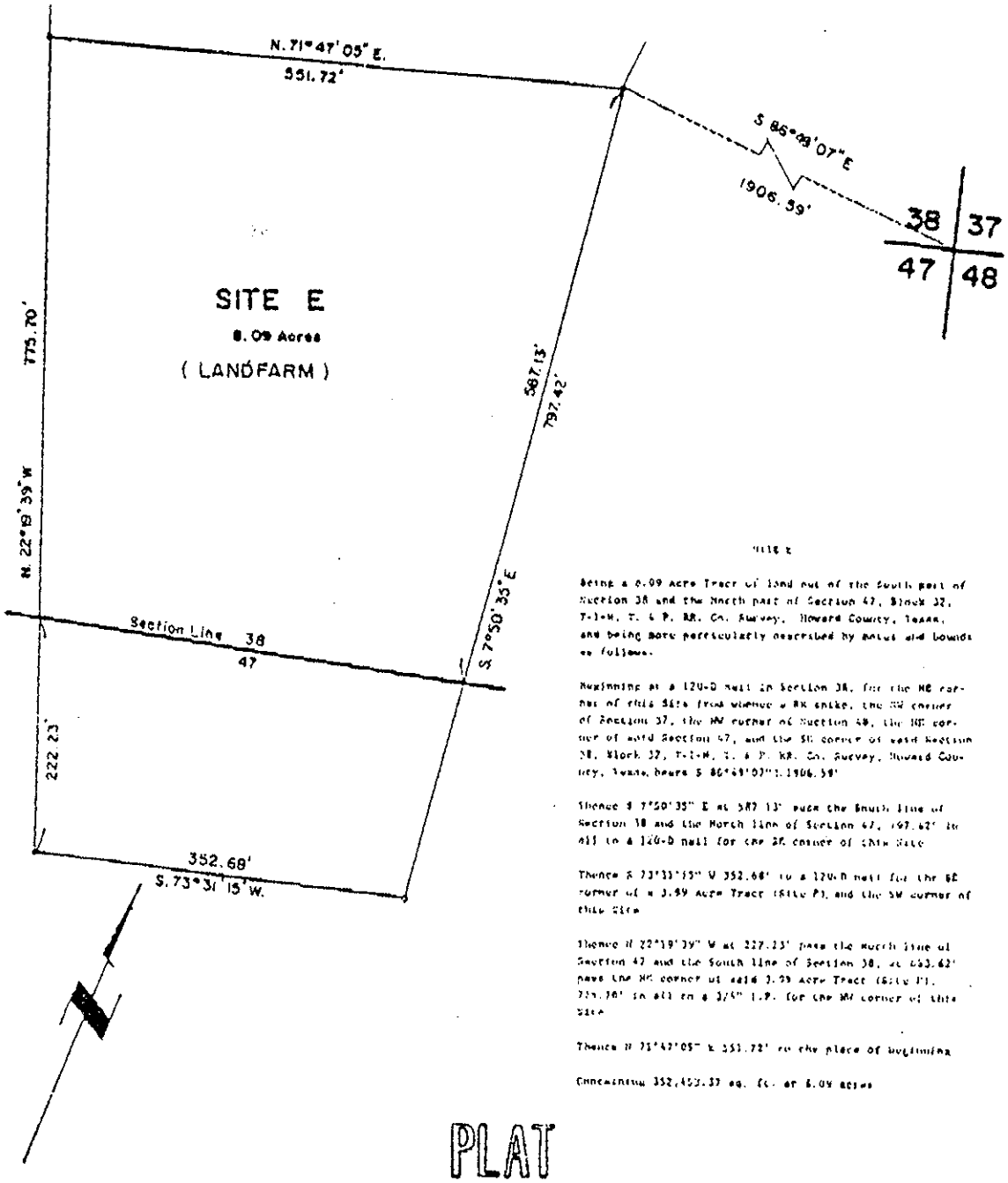
Thence N 22°19'39" W at 222.23' pass the North line of Section 47 and the South line of Section 38, at 653.62' pass the NE corner of said 3.99 Acre Tract (Site F), 775.70' in all to a 3/4" I.P. for the NW corner of this Site

Thence N 71°47'05" E 551.72' to the place of beginning.

Containing 352,453.37 sq. ft. or 8.09 acres.

Clifton R. Crim
Registered Public Surveyor





TITLE X

Being a 8.09 acre Tract of land out of the South part of Section 38 and the North part of Section 47, Block 32, T-1-N, T. & P. RR. Co. Survey, Howard County, Texas, and being more particularly described by metes and bounds as follows:

Beginning at a 1/2"-D nail in Section 38, for the NE corner of this Site from whence a RR spike, the SW corner of Section 37, the NW corner of Section 48, the NE corner of said Section 47, and the SE corner of said Section 38, Block 32, T-1-N, T. & P. RR. Co. Survey, Howard County, Texas, bears S 86°49'07" E. 1906.39'

Thence S 7°50'35" E at 587.13' pass the South line of Section 38 and the North line of Section 47, 797.42' in all to a 1/2"-D nail for the SE corner of this Site

Thence S 73°31'15" W 352.68' to a 1/2"-D nail for the SE corner of a 3.99 acre Tract (Site F), and the SW corner of this Site

Thence N 22°19'39" W at 222.23' pass the North line of Section 47 and the South line of Section 38, at 663.62' pass the NW corner of said 3.99 acre Tract (Site F), 775.70' in all to a 3/4" I.P. for the NW corner of this Site

Thence N 71°47'05" E 551.72' to the place of beginning

Containing 352,453.37 sq. ft. or 8.09 acres

PLAT
of
FINA OIL AND CHEMICAL COMPANY
SITE E (LANDFARM)
SECTION 38, BLOCK 32, T-1-N,
T. & P. RR. CO. SURVEY,
HOWARD COUNTY, TEXAS

Scale 1" = 100'

I CERTIFY THAT THE ABOVE PLAT WAS PREPARED FROM FIELD NOTES OF ACTUAL SURVEYS MADE BY ME OR UNDER MY SUPERVISION, AND THAT THE SAME ARE TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF.

M. L. Joyce McGonagle
REGISTERED PUBLIC SURVEYOR

STATE OF TEXAS
MICHAEL LYNN MCGONAGLE
4161
REGISTERED PUBLIC SURVEYOR

GSW & Associates Inc.

	DRWN	CHKD	SUR	FN
BY	B.L.	M.M.		
DATE	3/1/88	3/1/88		

G.S.W. & ASSOCIATES, INC.
Civil Engineering / Surveying

March 07, 1988

5.0 ACRE TRACT
SITE "H"
LAND TREATMENT UNIT

BEING a 5.0 Acre Tract of land out of the NW/4 of Section 38, Block 32, T-1-N, T. & P. RR. Co. Survey, Howard County, Texas, described by metes and bounds as follows:

BEGINNING at a ½" I.R. in the NW/4 of Section 38, Block 32, T-1-N, T. & P. RR. Co. Survey, Howard County, Texas, for the NE corner of this tract; from whence the NE corner of said Section 38, bears N. 57°56'46" E. 1755.5'

THENCE S. 14°44'11" E. 560.0' to a ½" I.R. for the SE corner of this tract

THENCE S. 75°15'49" W. 390.0' to a ½" I.R. for the SW corner of this tract

THENCE N. 14°44'11" W. 560.0' to a ½" I.R. for the NW corner of this tract

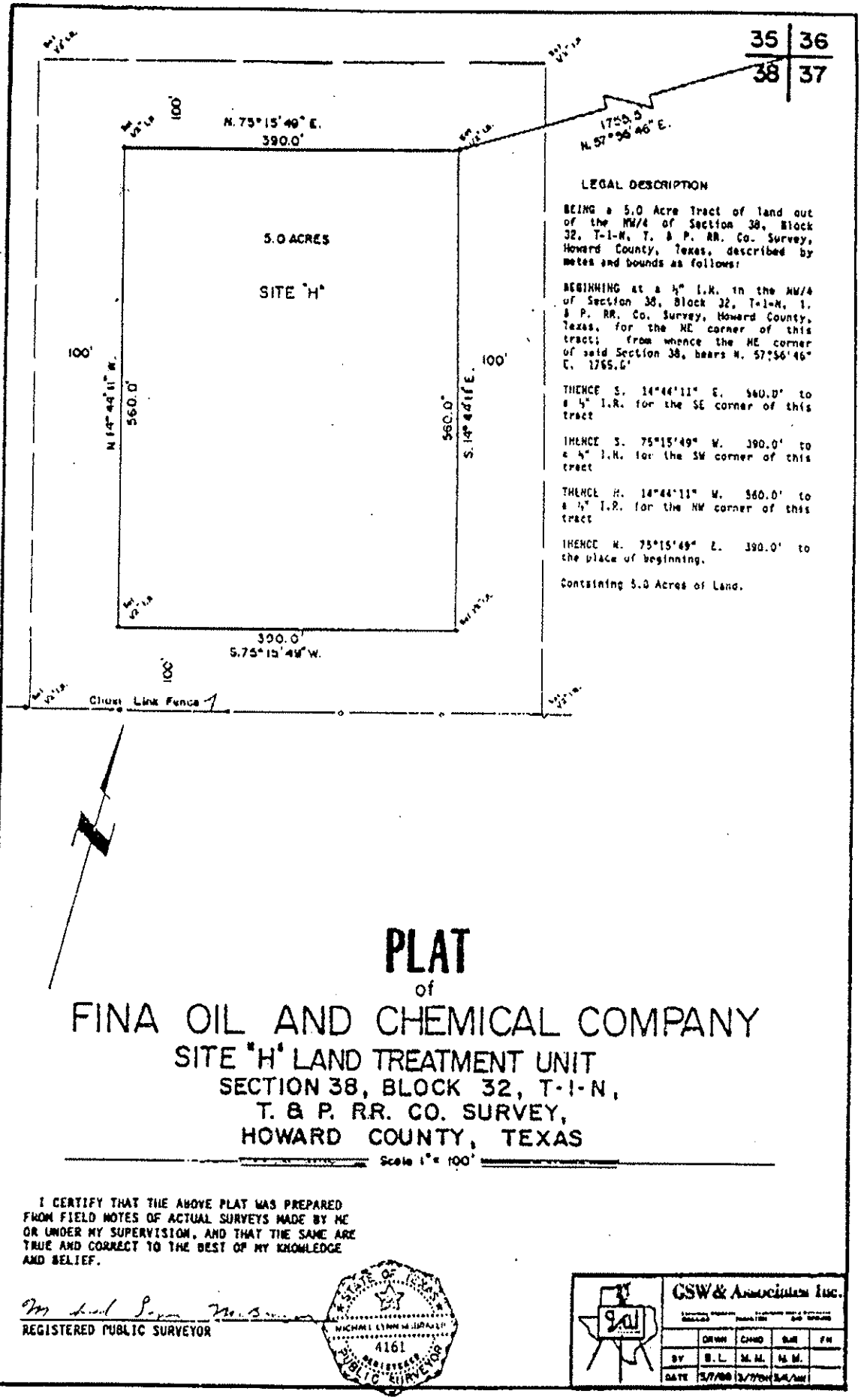
THENCE N. 75°15'49" E. 390.0' to the place of beginning.

Containing 5.0 Acres of Land.

Michael Lynn McBrayer
Registered Public Surveyor
No. 4161

STATE OF TEXAS
MICHAEL LYNN McBRAYER
4161
REGISTERED PUBLIC SURVEYOR

11171 HARRY HINES BLVD. • SUITE 113 • DALLAS, TEXAS 75229 • PHONE 214/620-1255
711 E. THIRD ST. • BIG SPRING, TEXAS 79720 • PHONE 915/263-1098



LEGAL DESCRIPTION

BEING a 5.0 Acre Tract of land out of the NW/4 of Section 38, Block 32, T-1-N, T. & P. RR. Co. Survey, Howard County, Texas, described by metes and bounds as follows:

BEGINNING at a ½" I.R. in the NW/4 of Section 38, Block 32, T-1-N, T. & P. RR. Co. Survey, Howard County, Texas, for the NE corner of this tract; from whence the NE corner of said Section 38, bears N. 57°56'46" E. 1765.5'

THENCE S. 14°44'11" E. 560.0' to a ½" I.R. for the SE corner of this tract

THENCE S. 75°15'49" W. 390.0' to a ½" I.R. for the SW corner of this tract

THENCE N. 14°44'11" W. 560.0' to a ½" I.R. for the NW corner of this tract

THENCE N. 75°15'49" E. 390.0' to the place of beginning.

Containing 5.0 Acres of Land.

PLAT

of

FINA OIL AND CHEMICAL COMPANY

SITE "H" LAND TREATMENT UNIT

SECTION 38, BLOCK 32, T-1-N, T. & P. R.R. CO. SURVEY, HOWARD COUNTY, TEXAS

Scale 1"= 100'

I CERTIFY THAT THE ABOVE PLAT WAS PREPARED FROM FIELD NOTES OF ACTUAL SURVEYS MADE BY ME OR UNDER MY SUPERVISION, AND THAT THE SAME ARE TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF.

REGISTERED PUBLIC SURVEYOR

STATE OF TEXAS
MICHAEL LYNN McGRAW
4161
REGISTERED PUBLIC SURVEYOR

GSW & Associates Inc.

	DRWN	CHKD	SUR	FN
BY	B.L.	M.M.	M.M.	
DATE	5/7/08	5/7/08	5/8/08	

Alon USA, LP
Alon Big Spring Refinery – Big Spring, TX

Hazardous Waste Permit 50140 - Part B
Application SWR No. 30083 / RN100250869 / CN600881783

SECTION II
SUPPLEMENTAL INFORMATION
SOURCES OF INFORMATION

335.204(a)	Storage or processing facilities (excluding storage surface impoundments).	
335.204(a)(1)	A storage or processing facility (excluding storage surface impoundments) may not be located in the 100-year floodplain unless it is designed, constructed, operated, and maintained to prevent physical transport of any hazardous waste by a 100-year flood event. "Physical transport" does not include movement of hazardous waste by an owner or operator to move the hazardous waste to safety during the threat of a 100-year flood event.	1. See Figure II.F.1. – 100-Year Flood Map The 100-year flood map provided in Figure II.F.1. is the most recent version available (Created 2010, refreshed in 2024). Portions of the facility are in the 100-year flood plain, however, in the area of the Site E Land Treatment Unit (LTU), the markings indicating this area to be in the 100-year floodplain are inaccurate. The area indicated (northern part of Site E) is that which previously existed before construction of the Site E LTU and indicates the area of two former surface impoundments (WP-7A and WP-29) that are overlain by the Site E LTU. The Site E LTU was closed in 1995 and a cover was installed that raised the topography of the closed unit higher so that the final height at Site E is well above that of the surrounding area and therefore presents no risk of flooding during a 100-year flood event. The other areas denoted as being within the 100-year floodplain (Zone A) are Sandy Creek and the areal extent former surface impoundments (WP-14, WP-13, WP-7, WP-21) prior to being closed and backfilled. None of the hazardous waste management units subject to permitting in this renewal application (Site E LTU, Site H LTU, and Container Storage Areas A, B, C) is within the 100-year floodplain. Big Sandy Draw drains an extensive area around the facility property. The flood map indicates that the floodway and floodplain of this surface-water body are over one-half mile to the west of the nearest hazardous waste management unit.

		2. Specific Flood levels – Not Applicable, not within 100-year floodplain 3. Flood Detection Devices - Not Applicable, not within 100-year floodplain 4. Waste Removal due to flooding - Not Applicable, not within 100-year floodplain
335.204(a)(2)	A storage or processing facility (excluding storage surface impoundments) may not be located in wetlands.	No wetlands could be identified through Texas Parks and Wildlife Department, Texas Commission on Environmental Quality, U.S. Environmental Protection Agency or U.S. Core of Engineers databases or maps.
335.204(a)(3)	A storage or processing facility (excluding storage surface impoundments) may not be located on the recharge zone of a sole-source aquifer unless secondary containment is provided to preclude migration to groundwater from spills, leaks or discharges.	Recharge zone of a sole-source aquifer – See Figure II.A.1. – Sole Source Aquifers
335.204(a)(4)	A storage or processing facility (excluding storage surface impoundments) may not be located in areas overlying regional aquifers unless: (A) the regional aquifer is separated from the facility by a minimum of ten feet of material with a hydraulic conductivity toward the aquifer not greater than 10-7 centimeters per second (cm/sec), or a thicker interval of more permeable material which provides equivalent or greater retardation to pollutant migration; or (B) secondary containment is provided to preclude migration to groundwater from spills, leaks or discharges.	Area overlying a regional aquifer – See Figure II.A.2. – Major Regional Aquifer Map with Location, Appendix VI – Geology Report, Section VI.B.1.
335.204(a)(5)	A storage or processing facility (excluding storage surface impoundments) may not be located in areas where soil unit(s) within five feet of the containment structure have a Unified Soil Classification of GW, GP, GM, GC, SW, SP, or SM, or a hydraulic conductivity greater than 10 -5 cm/sec unless: (A) secondary containment is provided to preclude migration to groundwater or surface water from spills, leaks or discharges; or (B) the soil unit is not sufficiently thick and laterally continuous to provide a significant pathway for waste migration.	Soil within five feet of treatment zone – See Appendix VI – Geology Report, Section VI.A.4.
335.204(a)(6)	A storage or processing facility (excluding storage surface impoundments) may not be located in areas of direct drainage within one mile of a lake at its maximum conservation pool level, if the lake is used to supply public drinking water through a public water system, unless the design, construction, and operational features of the facility will prevent adverse effects resulting from a release in such areas.	Areas of direct drainage within one mile of a lake - No surface water within 1-mile of the facility is utilyzed as a public drinking water supply.
335.204(a)(7)	A storage or processing facility (excluding storage surface impoundments) may not be located in areas of active geologic processes unless the design, construction, and operational features of the facility will prevent adverse effects resulting from the geologic processes.	Active Geologic processes - See Appendix VI – Geology Report, Section VI.A.1.
335.204(a)(8)	A storage or processing facility may not be located in the critical habitat of an endangered species of plant or animal unless the design, construction, and operational features of the facility will prevent adverse effects on the critical habitat of the endangered species.	Critical Habitat - A review of the Texas Park and Wildlife Department's endangered species database showed a few mammals with territories

		overlapping the facility location but none has a habitat indentified in the facility area. No endangered plants were identified in Howard County. Several endangered birds had migratory areas that overlap the facility area but specific habitats are not located in the facility area.
335.204(a)(9)	A storage or processing facility may not be located within 30 feet of the upthrown side or 50 feet of the downthrown side of the actual or inferred surface expression of a fault that has reasonably been shown to have caused displacement of shallow Quaternary sediments or of man-made structures, unless the design, construction, and operational features of the facility will prevent adverse effects resulting from fault movement. The presence, and if a fault is found to be present, the width and location of the actual or inferred surface expression of a fault, including both the identified zone of deformation and the combined uncertainties in locating a fault trace, shall be determined by a licensed professional geoscientist or geotechnical engineer. For purposes of fault assessment under this paragraph, depths of shallow sediments to be considered could be as little as 100 feet (for older, slowly accumulated sediments), or as great as 300 feet (for younger, rapidly accumulated sediments). The fault study should include analyses of any electric logs developed for any required subsurface characterization of the site, interpretation of available aerial photographs, study of available maps, logs, and documents that may indicate fault locations at the surface and in the subsurface, and a visual observation of the proposed site.	Within 30-feet of upthrown side or 50-feet of downthrown side of fault - See Appendix VI – Geology Report, Sections VI.A.1.a., VI.A.1.b, and VI.A.1.c.
335.204(b)	Land Treatment Facilities	
335.204(b)(1)	A land treatment facility may not be located in the 100-year floodplain unless it is designed, constructed, operated and maintained to prevent physical transport of any hazardous waste by a 100-year flood event. A new commercial hazardous waste management facility land treatment unit may not be located in a 100-year flood plain, unless the applicant demonstrates to the satisfaction of the commission that the facility design will prevent the physical transport of any hazardous waste by a 100-year flood event.	1. See Figure II.F.1. – 100-Year Flood Map The 100-year flood map provided in Figure II.F.1. is the most recent version available. Portions of the facility are in the 100-year flood plain, however, in the area of the Site E Land Treatment Unit (LTU), the markings indicating this area to be in the 100-year floodplain are inaccurate. The topography shown is that which previously existed before construction of the Site E LTU and shows the outline of the two former surface impoundments (WP-7A and WP-29) that are overlain by the Site E LTU. The Site E LTU was closed in 1995 and a cover was installed that raised the topography higher so that the final height at Site E is well above that of the surrounding area and therefore presents no risk of flooding during a 100-year flood event.

		The other areas denoted as being within the 100-year floodplain (Zone A) represents the areal extent former surface impoundments prior to being closed and backfilled. None of the hazardous waste management units subject to permitting in this renewal application (Site E LTU, Site H LTU, and Container Storage Areas A, B, C) is within the 100-year floodplain. Big Sandy Draw drains an extensive area around the facility property. The flood map indicates that the floodway and floodplain of this surface-water body are over one-half mile to the west of the nearest hazardous waste management unit. 2. Specific Flood levels – Not Applicable, not within 100-year floodplain 3. Flood Detection Devices - Not Applicable, not within 100-year floodplain 4. Waste Removal due to flooding - Not Applicable, not within 100-year floodplain
335.204(b)(2)	A land treatment facility may not be located in wetlands.	No wetlands could be identified through Texas Parks and Wildlife Department, Texas Commission on Environmental Quality, U.S. Environmental Protection Agency or U.S. Core of Engineers databases or maps.
335.204(b)(3)	A land treatment facility may not be located in the recharge zone of a sole-source aquifer.	Recharge zone of a sole-source aquifer – See Figure II.A.1. – Sole Source Aquifers
335.204(b)(4)	A land treatment facility may not be located in areas overlying regional aquifers unless: (A) it is an area where the average annual evaporation exceeds average annual rainfall plus the hydraulic loading rate of the facility by more than 40 inches and the depth to the regional aquifer is greater than 100 feet from the base of the treatment zone; or (B) the regional aquifer is separated from the base of the treatment zone by a minimum of ten feet of material with a hydraulic conductivity toward the aquifer not greater than 10-7 cm/sec, or a thicker interval of more permeable material which provides equivalent or greater retardation to pollutant migration.	Area overlying a regional aquifer – See Figure II.A.2. – Major Regional Aquifer Map with Location, Appendix VI – Geology Report, Section VI.B.1.

335.204(b)(5)	A land treatment facility may not be located in areas where soil units(s) within five feet of the treatment zone have a Unified Soil Classification of GW, GP, GM, GC, SW, SP or SM, or a hydraulic conductivity greater than 10-5 cm/sec, unless: (A) it is in an area where the average annual evaporation exceeds average annual rainfall plus the hydraulic loading rate by more than 40 inches; or (B) the soil unit is not sufficiently thick and laterally continuous to provide a significant pathway for waste migration.	Annual Evaporation = 70.2 inches Annual Rainfall = 18.5 inches Hydraulic Loading Rate = 0 inch (closed unit) https://www.weather.gov/wrh/climate?wfo=maf Soil within five feet of treatment zone – See Appendix VI – *Geology Report*, Section VI.A.4.
335.204(b)(6)	A land treatment facility may not be located within 1,000 feet of an established residence, church, school, day care center, surface water body used for a public drinking water supply, or dedicated public park which is in use at the time the notice of intent to file a permit application is filed with the commission, or if no such notice is filed, at the time the permit application is filed with the commission. The measurement of distances required for a new hazardous waste land treatment facility shall be taken from a perimeter around the proposed new hazardous waste land treatment management unit. The perimeter shall be not more than 75 feet from the edge of the proposed new hazardous waste land treatment unit.	None – as determined from city resource search, aerial photographs, and reconnaissance of the area.
335.204(b)(7)	A land treatment facility may not be located in areas of direct drainage within one mile of a lake at its maximum conservation pool level, if the lake is used to supply public drinking water through a public water system, unless the design, construction, and operational features of the facility will prevent adverse effects resulting from a release in such areas.	No lakes within one mile
335.204(b)(8)	A land treatment facility may not be located in areas of active geologic processes unless the design, construction, and operational features of the facility will prevent adverse effects resulting from the geologic processes.	Active Geologic processes - See Appendix VI – *Geology Report*, Section VI.A.1.
335.204(b)(9)	A land treatment facility may not be located within 1,000 feet of an area subject to active coastal shoreline erosion if the area is protected by a barrier island or peninsula unless the design, construction, and operational features of the facility will prevent adverse effects resulting from storm surge and erosion or scouring by water. On coastal shorelines which are subject to active shoreline erosion and which are unprotected by a barrier island or peninsula, a separation distance from the shoreline to the facility must be at least 5,000 feet unless the design, construction, and operational features of the facility will prevent adverse effects resulting from storm surge and erosion or scouring by water.	Not Applicable
335.204(b)(10)	A land treatment facility may not be located in the critical habitat of an endangered species of plant or animal unless the design, construction, and operational features of the facility will prevent adverse effects on the critical habitat of the endangered species.	Critical Habitat - A review of the Texas Park and Wildlife Department's endangered species database showed a few mammals with territories overlapping the facility location but none has a habitat indentified in the facility area. No endangered plants were identified in Howard County. Several endangered birds had migratory areas that overlap the facility area but specific habitats are not located in the facility area.
335.204(b)(11)	A land treatment facility may not be located on a barrier island or peninsula.	Not Applicable

335.204(b)(12)	A land treatment facility may not be located within 30 feet of the upthrown side or 50 feet of the downthrown side of the actual or inferred surface expression of a fault that has reasonably been shown to have caused displacement of shallow Quaternary sediments or of man-made structures, unless the design, construction, and operational features of the facility will prevent adverse effects resulting from fault movement. The presence, and if a fault is found to be present, the width and location of the actual or inferred surface expression of a fault, including both the identified zone of deformation and the combined uncertainties in locating a fault trace, shall be determined by a licensed professional geoscientist or geotechnical engineer. For purposes of fault assessment under this paragraph, depths of shallow sediments to be considered could be as little as 100 feet (for older, slowly accumulated sediments), or as great as 300 feet (for younger, rapidly accumulated sediments). The fault study should include analyses of any electric logs developed for any required subsurface characterization of the site, interpretation of available aerial photographs, study of available maps, logs, and documents that may indicate fault locations at the surface and in the subsurface, and a visual observation of the proposed site.	Within 30-feet of upthrown side or 50-feet of downthrown side of fault - See Appendix VI – *Geology Report*, Sections VI.A.1.a., VI.A.1.b, and VI.A.1.c.
335.204(c)	Waste Piles	Not Applicable
335.204(d)	Storage Surface Impoundments	Not Applicable
335.204(e)	Landfills	Not Applicable
335.204(f)	Injection Wells	Not Applicable

Alon USA, LP
Alon USA Big Spring Refinery
Big Spring, TX

Hazardous Waste Permit 50140
Part B Application
SWR No. 30083 / RN100250869 / CN600881783

SECTION III
FACILITY MANAGEMENT

III. Facility Management

Provide all Part B responsive information in Appendix III. When preparing the physical format organize your submittal using the Format of Hazardous Waste permit Application and Instructions.

A. Compliance History and Applicant Experience

1. Provide listings of all solid waste management sites in Texas owned, operated, or controlled by the applicant as required by 30 TAC 305.50(a)(2).

2. For a new commercial hazardous waste management facility, provide a summary of the applicant's experience in hazardous waste management as required by 30 TAC 305.50(a)(12)(F).

RESERVED

B. Personnel Training Plan

Provide an outline of the facility training plan which includes all the information required by 40 CFR 264.16. Indicate which training will be repeated annually.

C. Security

Describe how the facility complies with the security requirements of 40 CFR 264.14 or submit a justification demonstrating the reasons for requesting a waiver of these requirements.

D. Inspection Schedule

Describe summary of inspection schedule and Table III.D in Appendix III.D in accordance with instructions below.

Provide an inspection schedule summary for the facility which reflects the requirements of 40 CFR 264.15(b), 264.33 and, where applicable, the specific requirements in 40 CFR 264.174, 264.193(i), 264.195, 264.226, 264.254, 264.273, 264.303, 264.347, 264.552, 264.574, 264.602, 264.1033(f), 264.1034, 264.1052, 264.1053(e), 264.1057, 264.1058, 264.1063, 264.1084, 264.1085, 264.1086, 264.1088, 264.1101(c)(4) and 270.14(b)(5). The inspection schedule should reflect the requirements described below. The schedule should encompass each type of hazardous waste management (HWM) unit (i.e., facility component) and its inspection requirements. For incorporation into a permit, complete Table III.D. - Inspection Schedule for all units to be permitted.

The owner or operator must inspect the facility for malfunctions and deterioration, operator errors, and discharges which may be causing or may lead to the release of hazardous waste constituents to the environment or which may pose a threat to human health. The owner or operator must conduct these inspections often enough to identify problems in time to correct them before they harm human health or the environment.

The owner or operator must develop and follow a written schedule for inspecting other basic elements such as monitoring equipment, safety and emergency equipment, security devices, the presence of liquids in leak detection systems, where installed, and operating and structural equipment (such as dikes and sump pumps) that are important to preventing, detecting, or responding to environmental or human health hazards.

If the owner or operator of a facility which contains a waste pile wishes to pursue an exemption from the groundwater monitoring requirements for that waste management

unit, the inspection schedule must include examination of the base for cracking, deterioration, or other conditions that may result in leaks. The frequency of inspection must be based on the potential for the liner (base) to crack or otherwise deteriorate under the conditions of operation (e.g., waste type, rainfall, loading rates, and subsurface stability).

E. Contingency Plan (Not Applicable to Permits for Post-Closure Care Only)

If the owner or operator has already prepared a Spill Prevention, Control, and Countermeasures (SPCC) Plan or some other emergency or contingency plan, he need only amend that plan to incorporate hazardous waste management provisions that are sufficient to comply with the requirements of this section. Provide a Contingency Plan which includes all the information required by 40 CFR Part 264 Subparts C and D, except for 40 CFR 264.56(d)(1) and 30 TAC 335.153(2). This plan must also include a drawing of the facility which shows the location of all emergency equipment. In addition, complete the following tables to summarize information expressed in more detail in the plan.

1. Arrangements with Local Authorities

Complete Table III.E.1. - Arrangements With Local Authorities to indicate arrangements (if made) with local authorities to familiarize local fire and police departments, local hospitals, equipment suppliers, and local and State emergency response teams with the layout of the facility, properties of hazardous waste handled at the facility and associated hazards, places where facility personnel would normally be working, entrances to and roads inside the facility, and possible evacuation routes. Provide documentation of the attempts and any arrangements made with local authorities and emergency response teams.

2. Emergency Coordinator's List

For inclusion into a permit, list in Table III.E.2. - Emergency Coordinators the persons qualified to act as emergency coordinator. List the alternates in the order in which they will assume responsibility.

3. Emergency Equipment List

For inclusion into a permit, list in Table III.E.3. - Emergency Equipment all types of emergency equipment at the facility [such as fire-extinguishing systems, spill-control equipment, communications and alarm systems (internal and external), and decontamination equipment], if this equipment is required. Briefly outline the equipment capabilities.

4. Waiver from Preparedness and Prevention Requirements

If the owner or operator wishes to request a waiver from any of the preparedness and prevention requirements, he must submit a justification demonstrating the reasons for requesting the waiver, as discussed below.

F. Emergency Response Plan - RESERVED

Alon USA, LP
Alon USA Big Spring Refinery
Big Spring, TX

Hazardous Waste Permit 50140 - Part B
Application SWR No. 30083 / RN100250869 / CN6001881783

APPENDIX III
APPLICATION RESPONSES
Facility Management

Alon USA, LP
Alon USA Big Spring Refinery
Big Spring, TX

Hazardous Waste Permit 50140 - Part B
Application SWR No. 30083 / RN100250869 / CN600881783

SECTION III
APPENDIX III.B.
PERSONNEL TRAINING PLAN

Alon USA LP

PERSONNEL TRAINING PLAN
Appendix III.B.

Alon USA Big Spring Refinery
Big Spring, Texas, Howard County
HWP 20140 / ISW 30083
EPA ID TXD00813468

January 2024

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SECTION 1 PERSONNEL TRAINING PLAN

Alon USA LP's (Alon's) personnel training program is designed to insure proper waste management and to reduce the potential for accidents that might threaten human health or the environment. By familiarizing Alon personnel handling hazardous wastes with their responsibilities and potential hazards associated with particular wastes, emergencies related to waste management will be minimized. Alon's personnel training program covers areas such as operation, safety, and emergency response and stresses the performance of tasks in a methodical and prescribed manner. Alon's trained personnel are able to respond effectively to emergencies and are familiar with emergency procedures, emergency equipment, and emergency systems.

Alon's personnel training program is designed to meet the following requirements:

- The training program is directed by a person trained in hazardous waste management procedures;
- The program is designed to ensure that Alon personnel will respond appropriately during an emergency situation;
- Alon personnel will successfully complete the initial training within six months of their date of employment as specified in 40 CFR §264.16(b) and will be supervised by a trained employee until they complete their training session;
- Alon personnel will take part in an annual review of the training program; and
- The Alon Environmental Group maintains documentation of the training of each employee and ensures yearly updates.

1.1 Hazards Posed by the Wastes Generated at Alon

Alon generates the hazardous wastes listed in Table III.B-1. The various generated wastes are hazardous for the following reasons:

- Toxicity (EPA listed wastes);
- Ignitability (Flash Point <140oF
- Corrosivity (pH ≤2 or ≥12.5 S.U.)
- Toxicity Characteristic (TC) for arsenic or chromium (>5.0 mg/L) and benzene (>0.5 mg/L) is waste leachate as determined by utilizing the Toxicity Characteristic Leaching Procedure (TCLP); and/or
- Sulfide reactivity (forms toxic H2S gas when exposed to acidic conditions).

Ignitable wastes pose a fire hazard. Wastes that contain TC concentrations of metals or benzene in excess of regulatory limits primarily pose hazards when ingested and are considered dangerous due to the possibility of ground-water contamination that could result from a release of the waste. Corrosive waste can corrode steel and other materials including skin. Wastes that

are hazardous due to sulfide reactivity can generate hydrogen sulfide gas when exposed to acidic conditions. Hydrogen sulfide gas is highly toxic and exposure to even low concentrations can cause irritation of mucous membranes. When inhaled it high concentrations, it can be fatal.

1.2 Training Program

The training program is directed by an Environmental Specialist of the Environmental Group. The Environmental Specialist has attended training on hazardous waste management. In addition, the Environmental Specialist continually monitors regulatory changes under RCRA that may affect Alon's training program.

1.2.1 General

All employees that work in areas where there is a potential exposure to hazardous wastes must attend the training program a minimum of once per year. Table III.B-2 indicates Alon personnel categories currently designated to receive training. New employees normally attend the first training session within six months after their hire, then once per year thereafter. In the event that new hires do not receive the training within six months, they will be supervised by trained personnel until such time they receive the training.

A training record (Figure III.B-1) is maintained for all Alon personnel trained in hazardous waste management procedures. Upon completing a classroom session, the employee is asked to sign and date their training record. Training records for each employee are retained by the Environmental Group for a minimum of three years beyond the last date of their employment with Alon.

The following is a brief description of the training manuals and training course outlines that are used by various departments at Alon's Big Spring refinery. The departments are listed as follows:

- Purchasing Department;
- Wastewater Group;
- Tank Farm Group;
- Maintenance Department; and
- Safety Department.

1.2.2 Hazardous Waste Training for the Purchasing Department

The Purchasing Department is responsible for shipping hazardous wastes offsite for disposal or recycling/reuse. The duties of the Purchasing Department include completing the Alon Bill of Lading and the Uniform Hazardous Waste Manifest and ensuring that all Department of Transportation (DOT) packaging, labelling, and placarding requirements are met. All employees in the Purchasing Department are required to complete a personnel training program that enables them to execute their jobs in compliance with applicable regulations. They are also trained to respond effectively to emergencies involving hazardous wastes under their control.

A training manual has been developed for the Purchasing Department personnel that contains the following sections:

- Introduction;
- Training Procedures;
- Contingency Plan and Emergency Procedures;
- Manifest System Procedures;
- Pre-Transport Requirements for Disposal Drums; and
- Checklist for Shipments of Hazardous Waste Offsite.

An annual training class is held for members of the Purchasing Department responsible for hazardous waste shipments. An outline of the classroom training program is as follows:

- Review of EPA/TCEQ regulations
  - Definition of hazardous waste
  - 90-day storage requirements
- Overview of hazardous wastes generated and associated hazards
- The manifest system
  - Uniform Hazardous Waste Manifest
  - Alon Bill of Lading
- Review of DOT shipping and labeling requirements
  - Definitions and lists of hazardous materials
  - Labeling of containers
  - Placarding of transport vehicles
- Waste handling procedures
  - Transport (vehicles and loading)
  - Storage (Container Storage Area)
  - Personnel safety – equipment and procedures
- Emergency Procedures
  - Communications
  - Alarm System
  - Emergency coordinator
  - Emergency response duties
  - Fire/Explosion
  - Spill
  - Ground-water contamination
- Emergency equipment – use and maintenance

- Evacuation
- Shutdown of operations
- Criminal penalty for certain unlawful acts
- Applicable regulations:
  - 30 TAC §335.152 – Regulations for treatment, storage, and disposal facilities.
  - 30 TAC §335.10 – Shipping procedures for generators of Class I waste.
  - 30 TAC §335.13 – Record keeping and reporting requirements for generators.
  - 30 TAC §335.65 through §335.67 – Adopts by reference DOT packaging, labelling, marketing, and placarding requirements (49 CFR §172, §173, §178, and §179).

1.2.3 Hazardous Waste Training for the Wastewater Group

The wastewater group operates the wastewater treatment system form which listed hazardous wastes are generated. These wastes include slop oil emulsion solids (K049), primary oil/water/solids separation sludges (F037), and primary/secondary oil/water/solids separation sludges (F037/F038).

A training manual has been developed for the Wastewater Group personnel that contains the following sections:

- Introduction
- Training Procedures
- Contingency Plan and Emergency Procedures
- Security Procedures and Equipment
- Documentation and Record Keeping

An annual training class is held for members of the Wastewater Group who operated the facilities that generate hazardous waste. Classroom topics are as follows:

- Review EPA/TCEQ regulations
  - Definition of hazardous waste
  - 90-day storage requirements
- Hazardous wastes generated within the Wastewater Group and the hazards associated with those wastes
  - Slop Oil Emulsion Solids
  - Primary Oil/Water/Solids Separation Sludges
  - Primary/Secondary Oil/Water/Solids Separation Sludges
- Waste management at the point of generation
  - Placement into containers for offsite transport

  - Safety procedures and equipment
  - Volume of waste that can be stored at the point of generation
- Hazardous waste determination
- Emergency Procedures
  - Communications
  - Alarm System
  - Emergency coordinator
  - Emergency response duties
    - Fire
    - Spill
    - Ground-water contamination
    - Emergency equipment – use and maintenance
    - Evacuation
    - Shutdown of operations
- Criminal penalty for certain unlawful acts
- Applicable Regulations
  - 30 TAC §335.63 – Hazardous Waste Determination
  - 30 TAC §335.152 – Standards for treatment, storage, and disposal facilities
  - 30 TAC §335.153 – Reporting of emergencies by emergency coordinator
  - 30 TAC §335.171 – Design and operation of land treatment units.

1.2.4 Hazardous Waste Training for the Tank Farm Group

The Tank Farm Group operates facilities that generate several wastes that are either listed or characteristically hazardous wastes. These wastes include leaded tank bottoms, ignitable petroleum product tank bottoms, crude oil tank bottoms, and intermediate petroleum product tank bottoms. Tank and pipeline leaks and spills and cleanup residues may also be hazardous and result in the generation of ignitable spill cleanup waste, light petroleum product spill cleanup waste, and intermediate petroleum product spill cleanup waste.

A training manual has been developed for workers in the Tank Farm Group that contains the following sections:

- Introduction
- Training Procedures
- Contingency Plan and Emergency Procedures

- Security Procedures and Equipment
- Documentation

An annual training class is held for members of the Tank Farm Group who operate facilities that generate hazardous wastes. Classroom topics are as follows:

- Review of EPA/TCEQ regulations
  - Definition of hazardous waste
  - 90-day storage requirements
- Hazardous wastes generated within the Tank Farm Group and the hazards associated with those wastes
  - Ignitable Petroleum Product Tank Bottoms
  - Ignitable Spill Cleanup Waste
  - Hydrocarbons, Mixed and Miscellaneous
  - Crude Oil Tank Bottoms
  - Light Petroleum Product Tank Bottoms
  - Intermediate Petroleum Product Tank Bottoms
  - Light Petroleum Product Spill Cleanup Waste
  - Intermediate Petroleum Product Spill Cleanup Waste
  - Waste Management at the point of generation
  - Placement into containers for offsite transport
  - Safety procedures and equipment
  - Volume of waste that can be stored at the point of generation
- Hazardous waste determination
- Emergency Procedures
  - Communications
  - Alarm System
  - Emergency coordinator
  - Emergency response duties
    - Fire
    - Spill
    - Ground-water Contamination
  - Emergency equipment – use and maintenance
  - Evacuation
  - Shutdown on operations
- Criminal penalty for certain unlawful acts

- Applicable Regulations
  - 30 TAC §335.63 – Hazardous waste determination
  - 30 TAC §335.152 – Standards for treatment, storage, and disposal facilities
  - 30 TAC §335.153 – Reporting of emergencies by emergency coordinator
  - 30 TAC §335.171 – Design and operation of land treatment units.

1.2.5 Hazardous Waste Training for the Maintenance Department

Several individuals in the Maintenance Department are involved in the supervision, operation, and maintenance of the Site H LTU (disking, irrigation, fertilization, pH adjustment). Also, some individuals in the maintenance department drum and transport wastes from the process units to the Container Storage Area. This includes the management of all of the remaining hazardous wastes generated at the refinery, including spent treating clays, chromate bearing solids from the cooling tower system, and spent catalysts from the HDS units. A training manual has been developed for workers in the Maintenance Department that contains the following sections:

- Introduction
- Training Procedures
- Contingency Plan and Emergency Procedures
- Security Procedures and Equipment
- Documentation
- Inspection

An annual training class is held for those members of the Maintenance Department that may manage hazardous wastes. An outline of the classroom training program is as follows:

- Review of EPA/TCEQ regulations
  - Definition of hazardous waste
  - 90-day storage requirements
- Hazardous wastes generated within the Maintenance Department and the hazards associated with those wastes
  - Spent catalyst – Mo/Co on Alumina
  - Spent Reformer Catalyst
  - Spent Catalyst – Co/Ni/Mo on Alumia
  - Spent Catalyst – Ni/Mo on Alumina
  - Chromate Bearing Solids
  - Lead-Contaminated Soils

  - Ignitable Spent Treating Clay
  - Spent Treating Clay
- Waste handling procedures
  - Waste management areas
  - Transport (vehicles and loading)
  - Storage (Container Storage Area)
  - Labeling and record keeping
  - Personal safety equipment and procedures
  - Volume of waste that can be stored at the point of generation
- Hazardous waste determination
- Maintenance and inspection
  - Container Storage Area
  - Site H LTU
- Emergency procedures
  - Communications
  - Alarm system
  - Emergency coordinator
  - Emergency response duties
    - Fire/Explosion
    - Spill
    - Groundwater contamination
  - Emergency equipment – use and maintenance
  - Evacuation
  - Shutdown of operations
- Criminal penalty for certain unlawful acts
- Applicable Regulations
  - 30 TAC §335.69 – Accumulation time (requirements for 90-day storage).
  - 30 TAC §335.70 – Recordkeeping for generators
  - 30 TAC §335.63 – Hazardous waste determination
  - 30 TAC §335.152 – Regulations for treatment, storage, and disposal facilities.
  - 30 TAC §335.171 – Design and operation of land treatment units.

1.2.6 Hazardous Waste Training for the Safety Department

The Safety Department is responsible for emergency response procedures throughout the facility. Employees in the Safety Department must be familiar with the contingency plan, especially those portions of the plan that address the location and maintenance of emergency equipment, the emergency telephone numbers, and alarm signals. A training manual has been developed for workers in the Safety Department that contains the following sections:

- Introduction
- Training Procedures
- Contingency Plan and Emergency Procedures
- Security Procedures and Equipment
- Documentation

An annual training class is held for those members of the Safety Department. An outline of the classroom training program is as follows:

- Review of EPA/TCEQ regulations
  - Definition of hazardous waste
  - 90-day storage requirements
- Overview of hazardous wastes generated and associated hazards
- Safety procedures
  - Waste management areas
  - Safe handling practices
  - Safety equipment and clothing
  - Labeling and recordkeeping
- Emergency Procedures
  - Communications
  - Alarm system
  - Emergency coordinator
  - Emergency response duties
    - Fire
    - Spill
    - Ground-water contamination
  - Emergency equipment – use and maintenance
  - Evacuation
  - Shutdown of operations
- Criminal penalty for certain unlawful acts

- Applicable Regulations
  - 30 TAC §335.152 – Standards for treatment, storage, and disposal facilities
  - 30 TAC §335.153 – Reporting of emergencies by emergency coordinator.

TABLES

Table III.B-1 Hazardous Wastes and Management Activities

Table III.B-2 Alon Employee Categories Designated to Receive Hazardous Waste Training

Table III.B-1
Hazardous Wastes and Management Activities

Verbal Description of Waste	TX Form Code	EPA Form Code	Source Code	TCEQ Waste Code & Waste Class	EPA Hazardous Waste Code	Waste Management Activities				Annual Quantity Generated and/or Received[3] (tons)	SIC Code and Process
						Off-Site	On-Site				
						Disposal	Storage[(1)]	Processing[(2)]	Disposal		
Chromium-Contaminated Soil	302	W301	G32	0006302H	D007	X	X			0.00	2911 Petroleum Refining
Spent Filters with benzene	310	W310	G16	0008310H	D018	X	X			0.00	2911 Petroleum Refining
Heat Exchanger Bundle Cleaning Sludge	695	W609	G13	0010695H	K050	X	X			65.71	2911 Petroleum Refining
Spent Caustic Solution in Water	110	W110	G08	0014110H	D002		X		WWTP	0.00	2911 Petroleum Refining
Filter Media from Aromex Unit	489	W319	G07	0018489H	D018		X			0.00	2911 Petroleum Refining
Computer Monitors, Keyboards, Circuit Boards, Circuit board casings & Containers that came in contact with battery	309	W309	G16	0019309H	D007, D008, D009	X				0.00	2911 Petroleum Refining
Tank Bottom cleanout scale & solids	489	W319	G14	0023489H	D001, K169	X	X			10.90	2911 Petroleum Refining
Slop oil emulsion sludge from separation of recoverable oil	603	W603	G09	0027603H	K049		X		WWTP	0.00	2911 Petroleum Refining
Concentrated aqueous solution of off-spec Mercaptan & other organic liquids offspec or needing disposal	207	W219	G11	0043207H	D001	X				0.00	2911 Petroleum Refining
Merox Unit Disulfide Seperator material	489	W319	G07	0060489H	D018		X			0.00	2911 Petroleum Refining
Petroleum contaminated Solids	289	W289	G32	0074289H	D018	X				26.02	2911 Petroleum Refining
Primary oil/water/solids separation sludge (dewatered)	319	W319	G25	0075319H	F037		X		WWTP	197.17	2911 Petroleum Refining
Spent carbon	404	W310	G49	0100404H	D018	X	X			0.00	2911 Petroleum Refining
Gasoline Filters, material containing benzene	310	W219	G07	0110310H	D001, D018	X	X			0.61	2911 Petroleum Refining
Crude oil tank bottoms	489	W319	G14	0113489H	D018, K169	X	X			0.00	2911 Petroleum Refining
Clarified slurry oil tank sediment	489	W319	G14	0114489H	K170		X			0.00	2911 Petroleum Refining
Tetraethylene Glycol solvent containing benzene and toluene	489	W219	G13	0116489H	D001, D018		X			0.00	2911 Petroleum Refining
Tank Bottom Sludge from Tank Cleanouts	695	W609	G14	0123695H	D018	X	X			112.45	2911 Petroleum Refining
Waste paint and paint related material (ignitable)	209	W209	G11	0129209H	DOO1, D035, F005	X	X			0.00	2911 Petroleum Refining
Spent Catalyst Co/Ni/Mo on Alumina	393	W319	G08	0135393H	D001, D003, D004	X	X			0.00	2911 Petroleum Refining

Table III.B-1
Hazardous Wastes and Management Activities

Verbal Description of Waste	TX Form Code	EPA Form Code	Source Code	TCEQ Waste Code & Waste Class	EPA Hazardous Waste Code	Waste Management Activities				Annual Quantity Generated and/or Received[3] (tons)	SIC Code and Process
						Off-Site	On-Site				
						Disposal	Storage[(1)]	Processing[(2)]	Disposal		
Spent Hydrotreating Catalyst	393	W319	G08	0138393H	K171	X	X			191.66	2911 Petroleum Refining
Primary/Secondary oil/water/solid separator wastewater sludge	319	W319	G23	0140319H	F037, F038	X				0.00	2911 Petroleum Refining
Non-Acute Hazardous Chemical Lab Waste	003	W001	G11	0144003H	D001, D002, D003, D006, D007, D008, D009, D011, F003, F005	X	X			0.17	2911 Petroleum Refining
Petroleum contaminated soils exhibiting the characteristics of ignitability	489	W301	G13	0155489H	D001		X			0.00	2911 Petroleum Refining
Chromium contaminated metal scale, filings, scrap, or blast material	307	W307	G13	0171307H	D007	X	X			0.00	2911 Petroleum Refining
DGA filter, material containing benzene	489	W219	G07	0200489H	D018	X	X			7.04	2911 Petroleum Refining
SCOTT Quench Filters	489	W219	G07	0300489H	D018	X	X			3.32	2911 Petroleum Refining
DHT filters with high concentration of H2S	801	W310	G13	0500801H	U135	X	X			0.00	2911 Petroleum Refining
Waste resulting from neutralization activites in the Alky Unit	110	W110	G32	0501110H	D002	X	X			0.00	2911 Petroleum Refining
Dry/Slurry metal hydroxide such as KOH that is off-spec or from an onsite process or service activity	305	W316	G11	0568305H	D002		X			17.24	2911 Petroleum Refining

[1] "Storage" means the holding of solid waste for a temporary period, at the end of chich the waste is processed, disposed of, or stored elsewhere

[2] "Processing" means the extraction of materials, transfer, volume reduction, conversion to energy, or other separation and preparation of solid waste for reuse or disposal, including the treatment or neutralization of hazardous waste, designed to change the physical, chemical, or biological character or composition of any hazardous waste so as to neutralize such waste, or so as to recover energy or material from the waste or so as to render such waste non-hazardous or less hazardous; safer for transport, store or dispose of; or amenable for recovery, amenable for storage, or reduced in volume. The "transfer" of solid waste for reuse or disposal as used above, does not include the actions of a transporter in conveying or transporting solid waste by truck, ship, pipeline, or other means. Unless the Executive Director determines that regulation of such activity is necessary to protect human health or the environment, the definition of "processing" does not include activities relating to those materials exempted by the Resource Conservation and Recovery Act, 42 USC §6901 et seq, as amended.

[3] Represents quantity generated and/or received during 2022.

Table III.B-2
Alon Employee Categories Designated to Receive Hazardous Waste Training

GROUP	EMPLOYEE CATEGORY
Purchasing	Supervisor
	Buyer
	Support Staff
Wastewater	Unit Foremen
	Wastewater Operator
Tank Farm	General Foremen
	Pumper
Maintenance	Manager
	Supeerintendent
	Group "A" Foreman
Safety Department	Safety Supervisor
	Safety Inspectors

FIGURE

Figure III.B-1 Sample Training Record

Figure III.B-1
Sample Training Record

Name:	
Job Position:	
Supervisor:	
Job Description:	

I have read and understand the Hazardous Waste Management Training Packet as it applies to my particular job and responsibilities.

Training Course Data:	Signature:

Alon USA, LP
Big Spring Refinery

Alon USA, LP
Alon USA Big Spring Refinery
Big Spring, TX

Hazardous Waste Permit 50140 - Part B
Application SWR No. 30083 / RN100250869 / CN600881783

SECTION III
APPENDIX III.C.
FACILITY SECURITY

Alon USA, LP

SECURITY
Appendix III.C.

Alon USA Big Spring Refinery
Big Spring, Texas, Howard County
HWP 20140 / ISW 30083
EPA ID TXD00813468

May 2024

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Figure III.C-9 Site E Land Treatment Unit Facility Warning Sign (East Road)
Figure III.C-10 Site E Land Treatment Unit Facility Warning Sign (South Road)

SECTION 1 SECURITY

Alon USA LP (Alon) has installed a security system at their Big Spring Refinery facility in order to prevent the accidental or unauthorized entry of persons or livestock. This security system includes:

- Warning signs on approaches to active portions of the facility;
- Security lighting;
- Security guards and personnel on duty at all times; and
- A six-foot high chain-link fence topped with three-strand (minimum) barbed wire which completely surrounds the active portions of the facility property with the exception of the railroad righ-of-way.

Warning signs with the legend "DANGER – UNAUTHORIZED PERSONNEL KEEP OUT" are posted on the roads leading to the hazardous waste management units/facilities. Lettering on all warning signs is legible from a distance of 25 feet. The signs are placed in highly visible locations.

Vehicles entering the plant are checked in by the security guards. All Alon personnel carry employee identification cards with electronic log-in/log-out chips embedded and have Alon vehicle passes. A physical and automated record is kept of the arrival and departure off all employees and visitors as well as the nature of visitors' business and what Alon employee they are working for and where they will be. Visiting vehicles are issued temporary gate passes with coded chips which are turned in upon completion of business.

Figures III.C-1 and III.C-2 are photographs of the main entrance gate (also showing the fence surrounding the facility). Figures III.C-3 and III-C-4 show warning signs placed at the active Container Storage Area. Figure III.C-5 and III-C-6 show the approaches to the closed Site E Land Treatment Unit and the closed Site H Land Treatment Unit, respectively.

FIGURES

Figure III.C-1 Main Entrance Gate (looking north)
Figure III.C-2 Main Entrance Gate (looking northwest)
Figure III.C-3 Warning Signs (fence) at the Container Storage Area
Figure III.C-4 Warning Signs (gate) at the Container Storage Area
Figure III.C-5 Site E Land Treatment Unit North Looking South
Figure III.C-6 Site E Land Treatment Unit East Looking West
Figure III.C-7 Site H Land Treatment Unit Entrance Sign
Figure III.C-8 Site H Land Treatment Unit Warning Sign
Figure III.C-9 Site E Land Treatment Unit Facility Warning Sign (East Road)
Figure III.C-10 Site E Land Treatment Unit Facility Warning Sign (South Road)

FIGURE III.C.

Photographic Log

Client Name	Site Location:	Part B Permit Renewal Section
Alon USA LP	Big Spring Refinery	Appendix III.C. (Security Plan)

FIGURE	Date
III.C-1	25-Jul-23

Site Feature
Main Entrance Gate

Description:
Looking North into the facility.

FILE PHOTO NUMBER:
DSCF2991

FIGURE	Date
III.C-2	25-Jul-23

Site Feature
Main Entrance Gate

Description:
Looking Northwest into facility.

FILE PHOTO NUMBER:
DSCF2992

FIGURE III.C.

Photographic Log

Client Name:	Site Location:	Part B Permit Renewal Section
Alon USA LP	Big Spring Refinery	Appendix III.C. (Security Plan)

FIGURE	Date
III.C-3	25-Jul-23

Site Feature
Container Storage Area

Description:
Fence Warning Signs. Looking South into unit

FILE PHOTO NUMBER:
DSCF2993

FIGURE	Date
III.C-4	25-Jul-23

Site Feature
Container Storage Area

Description:
Gate Warning Signs. Looking East into Unit.

FILE PHOTO NUMBER:
DSCF2994

FIGURE III.C.

Photographic Log

Client Name:	Site Location:	Part B Permit Renewal Section
Alon USA LP	Big Spring Refinery	Appendix III.C. (Security Plan)

FIGURE	Date
III.C-5	25-Jul-23

Site Feature
Site E Land Treatment Unit (closed)

Description:
North Looking South Across Unit

FILE PHOTO NUMBER:
DSCF2965

FIGURE	Date
III.C-6	25-Jul-23

Site Feature
Site H Land Treatment Unit (closed)

Description:
East looking West Across Unit

FILE PHOTO NUMBER:
DSCF2966

FIGURE III.C.

Photographic Log

Client Name:	Site Location:	Part B Permit Renewal Section
Alon USA LP	Big Spring Refinery	Appendix III.C. (Security Plan)

FIGURE	Date
III.C-7	25-Jul-23

Site Feature
Site H Land Treatment Unit (closed)

Description:
Site H Entrance Sign located Southeast Corner of Unit

FILE PHOTO NUMBER:
DSCF2967

FIGURE	Date
III.C-8	25-Jul-23

Site Feature
Site H Land Treatment Unit (closed)

Description:
Site H Warning Sign along sourthern boundary of unit

FILE PHOTO NUMBER:
DSCF2968

FIGURE III.C.

Photographic Log

Client Name:	Site Location:	Part B Permit Renewal Section
Alon USA LP	Big Spring Refinery	Appendix III.C. (Security Plan)

FIGURE	Date
III.C-9	25-Jul-23

Site Feature
Site H Land Treatment Unit (closed)

Description:
Site E Entrance Sign located Eastern boundary road.

FILE PHOTO NUMBER:
DSCF2969

FIGURE	Date
III.C-10	25-Jul-23

Site Feature
Site H Land Treatment Unit (closed)

Description:
Site E Warning Sign along sourthern boundary road.

FILE PHOTO NUMBER:
DSCF2970

Alon USA, LP
Alon USA Big Spring Refinery
Big Spring, TX

Hazardous Waste Permit 50140 - Part B
Application SWR No. 30083 / RN100250869 / CN600881783

SECTION III
APPENDIX III.D.
INSPECTION SCHEDULE

Alon USA LP

INSPECTION SCHEDULE
Appendix III.D.

Alon USA Big Spring Refinery
Big Spring, Texas, Howard County
HWP 20140 / ISW 30083
EPA ID TXD00813468

January 2024

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Figure III.D-5 Area Inspection Form for Site E Land Treatment Unit

SECTION 1 INSPECTION SCHEDULE

Alon currently conducts periodic inspections of both its Active and Closed hazardous waste management facilities at the Refinery. Details of the inspection schedule are presented herein.

1.1 Hazardous Waste Units

Alon presently operates one hazardous waste facility, the Container Storage Area (CSA), at the Big Spring Refinery. Two hazardous waste land treatment units, the Site E Land Treatment Unit (Site E LTU) and the Site H Land Treatment Unit (Site H LTU) were formerly operated at the facility. The Site E LTU was closed as a landfill in 1995, with closure certification received in 1996. The Site H LTU is currently in a 30-year post-closure monitoring program with the closure certification received in 2004.

1.1.1 Container Storage Area

The CSA is located north of the refinery process areas and is utilized for temporary storage of hazardous wastes prior to offsite transport. The following hazardous wastes are stored or may be stored in the future at the specified subareas at the site:

- Area A

- Spent Catalyst – Co/Mo on Alumina;
- Spent Reformer Catalyst;
- Spent Catalyst – Ni/Mo on Alumina;
- Spent Catalyst – Co/Ni/Mo on Alumina; and
- Spent Hydrotreating Catalyst.

- Area B

- Chromate Bearing Solids;
- Spent Fluorescent Lamps; and
- Lead-Contaminated Soils.

- Area C

- Spent Solvents; and
- Hydrocarbons, Mixed and Miscellaneous.

These materials are placed in steel drums at each waste generation site and transferred to the CSA upon direction from the respective Unit Foreman. The Maintenance Department coordinates the physical movement of all waste drums from generation sites to the CSA and is therefore contacted by a Unit Foreman when a movement is required. In addition, the Unit Foreman completes a waste transfer from that include the following information:

- Refinery unit;
- Unit Foreman's name;
- Type of waste;

- Amount of waste;
- Number of drums;
- Labeling of drums;
- Date transfer requested;
- Date transfer completed; and
- Any other pertinent information, as required.

Equipment utilized in the movement activity includes a forklift, flat-bed truck, and drum dolly. Containers of wastes are stored on wooden pallets until they are picked up for offsite reclamation, regeneration, or final disposal. The Environmental Group maintains all records on hazardous waste movements into and out of the CAS, and also initiates requests for outside waste hauling companies to remove drums from the site for ultimate re-use or disposal.

1.1.2 Site H Land Treatment Unit

The Site H LTU, now closed, has an area of five acres. The unit was constructed by excavating the natural soils, lining with compacted clay and two synthetic liners with an intervening leachate collection layer and leak detection systems, and backfilling with a mixture of original soils and imported clay to create a LTU that would be effectively isolated from the underlying sandy sediments and would be comprised of treatment zone soils having the desired characteristics for the complete and efficient treatment of the hazardous wastes.

The Site H LTU first operated under Phase I authorization, whereby only nonhazardous wastes were authorized for application to the unit. Upon receiving Texas Water Commission (TWC), predecessor agency to both the Texas Natural Resource Conservation Commission (TNRCC) and the Texas Commission on Environmental Quality (TCEQ), approval of the completed land treatment demonstration, the Site H LTU was authorized under Phase II for the treatment of hazardous wastes that wee no subject to land-disposal restrictions. The Site H LTU last received hazardous wastes on December 19,1994, with intentions of resuming hazardous waste application upon receipt of a non-migration variance from the Environmental Protection Agency (EPA). However, Alon formally withdrew its petition for a no-migration variance from the EPA in 1997 after numerous revisions and resubmittals. As a result, the Site H LTU was granted a Major Permit Modification – Closure of Site H on November 24, 2003 and the closure was approved on June 9, 2004. At that time a 30-year post-closure monitoring program was begun with the first sampling event taking place on July 17, 2004.

The Site H LTU was constructed as a replacement for the closed Site E LTU (see Section 1.1.3) and, when active, was authorized for the application of the following hazardous wastes:

- Listed and Ignitable Hazardous Wastes:

- Slop Oil Emulsion Solids (K049);
- Primary Oil/Water/Solids Separation Sludges (F037);

- Primary/Secondary Oil/Water/Solids Separation Sludges (F037, F038);
- Ignitable Petroleum Product Tank Bottoms (D001);
- Ignitable Spill Cleanup Waste (D001); and
- Ignitable Spent Treating Clay (D001).
  - Toxicity Characteristic (TC) Hazardous Wastes
- Tank Bottoms, Light Petroleum Products (D018)
- Tank Bottoms, Intermediate Petroleum Products (D018)
- Tank Bottoms, Crude Oil (D018)
- Spill Cleanup, Light Petroleum Products (D018)
- Spill Cleanup, Intermediate Petroleum Products (D018)
- Spent Treating Clay (D018)

These materials were transported by dump truck, vacuum truck, or dumpster truck from their respective waste generation points to the Site H LTU.

The Unit Foreman at each waste generation site was responsible for notifying the environmental group and requesting the Maintenance Department for transfer of the wastes to the Site H LTU. It was the duty of the Maintenance Department to arrange and coordinate safe and proper movement of these wastes to the site and incorporation of these wastes into the Site H LTU. In addition, a form was completed after each waste transfer that provided the following information:

- Refinery unit;
- Unit Foreman's name;
- Type of waste;
- Amount of waste;
- Date of Transfer Request;
- Person in Maintenance Department contacted;
- Date Transfer Completed; and
- Other pertinent information, as required.

This information would then be transmitted to the Environmental Group for recordkeeping.

As discussed above, the Site H LTU received its last waste load on December 19, 1994 and unit closure was approved on June 9, 2004.

1.1.3 Site E Land Treatment Unit

The 8.09-acre Site E LTU was closed as a landfill in 1995. This unit had formerly been utilized from 1976 to 1988 for the land treatment of hazardous sludges and biodegradable wastes. The following hazardous wastes were applied to the Site E LTU:

- Leaded Tank Bottoms (K052);
- Ignitable Petroleum Product Tank Bottoms (D001);
- Slop Oil Emulsion Solids – RVF Cake (K049);
- API Separator Sludge (K051);
- Ignitable Spill Cleanup Waste (D001); and
- Ignitable Spent Treating Clay (D001).

1.2 Hazardous Wastes Generated and Management Activities

Table III.D-1 identifies each hazardous waste currently generated at the Alon Refinery and the management activities associated with each identified waste.

1.3 Inspection Program

The inspection program described here in is intended to provide a procedure for discovering malfunctions, deterioration, operator errors, and discharges from the CSA and the closed Site H LTU that may potentially cause or lead to a release of hazardous waste to the environment or a threat to human health. The inspection program for the closed Site E LTU is described in the post-closure plan provided in Appendix VII.C. The program implemented at Alon will facilitate inspections of key elements in the waste-handling process, allowing identification of problems in time to correct them before human health or the environment are endangered.

A written schedule is utilized for inspecting all equipment and facilities that are important in preventing, detecting, or responding to environmental or human health hazards. The schedule is maintained for each unit and specifies the various inspection items and frequency of inspection as well as identifying how each item will be inspected. The goal of these inspection procedures is to ensure close monitoring of all hazardous waste units so they will continue to function as designed through their active lives and the post-closure periods.

1.4 Equipment Identification

The equipment covered in the inspection program is arranged in categories as follows:

- Safety/Emergency Equipment;
- Security Equipment;
- Communication Equipment;
- Mobile Equipment;
- Areas; and
- Structures.

Following is a listing of the items in each category and a brief discussion of their use in the hazardous waste management program at the Refinery.

1.5 Inspection Procedures

The safety/emergency equipment, security equipment, and communication equipment previously referenced are routinely used and/or maintained in several areas of the refinery. Alon has an ongoing maintenance program that provides for regularly scheduled inspection of all equipment utilized for these functions. Therefore, this section will instead focus on the inspection procedures for mobile equipment, areas, and structures that are specifically used primarily for the CSA and the Site H LTU. Each of these items have their own specific individual inspection requirements.

1.5.1 Mobile Equipment

- Vacuum Truck:
  - Perform overall mechanical visual inspection of the vehicle;
  - Check tire pressure by pressure gauge and adjust as needed;
  - Check all fluid levels;
  - Check vacuum hoses for leaks and worn couplings;
  - Check vacuum pump for seal leakage; and
  - Check vacuum truck vessel and fittings to assure leak-free operation.
- Dump Truck:
  - Perform overall mechanical visual inspection of the vehicle;
  - Check tire pressure by pressure gauge and adjust as needed;
  - Check all fluid levels;
  - Check all hydraulic hoses for leaks in hose and couplings; and
  - Inspect bed dump mechanism and lubricate as needed.
- Dumpster Truck:
  - Perform overall mechanical visual inspection of the vehicle;
  - Check tire pressure by pressure gauge and adjust as needed;
  - Check all fluid levels;
  - Check all hydraulic hoses for leaks in hose and couplings; and
  - Inspect dumpster hydraulic lift mechanism and lubricate as needed.
- Front-End Loader:
  - Perform overall mechanical visual inspection of the vehicle;
  - Check tire pressure by pressure gauge and adjust as needed;
  - Check all fluid levels;
  - Check all hydraulic hoses for leaks in hose and couplings; and
  - Inspect loading mechanism and lubricate as needed.

- Forklift:
  - Perform overall mechanical visual inspection of the vehicle;
  - Check tire pressure by pressure gauge and adjust as needed;
  - Check all fluid levels;
  - Check all hydraulic hoses for leaks in hose and couplings; and
  - Inspect forklift lifting mechanism and lubricate as needed.
- Flat-Bed Truck:
  - Perform overall mechanical visual inspection of the vehicle;
  - Check tire pressure by pressure gauge and adjust as needed;
  - Check all fluid levels; and
  - Inspect side rails and back gate of bed to assure no loss of waste during transport.
- Tractor/Disk Harrow:
  - Perform overall mechanical visual inspection of the vehicle;
  - Check tire pressure by pressure gauge and adjust as needed;
  - Check all fluid levels; and
  - Inspect disk connection mechanism and disk for signs of excessive mechanical wear.
- Bulldozer:
  - Perform overall mechanical visual inspection of the vehicle;
  - Check all fluids;
  - Inspect front blade lift mechanism;
  - Inspect hydraulic cylinders, hoses, and couplings; and
  - Check tracks for smooth movement over guide wheels and lubricate as needed.

1.5.2 Areas

- CSA (Areas A, B, and C):
  - Inspect drums for leaks;
  - Check for deterioration as a result of corrosion;
  - Insure that all lids and bungs are in place;
  - Check to verify that all drums are on pallets;
  - Inspect condition of pallets;
  - Check for standing water;
  - Perform overall visual inspection of area to insure that all security and safety equipment is intact;
  - Inspect drums for proper label completion and placement;

- Inspect drums for proper placement within the storage unit;
- Check contents against past records to assure internal manifest procedures are followed; and
- For drums shipping offsite, check completion of manifest forms and adherence of overall HWM manifest procedures for offsite disposal.

• Site H LTU (closed):

- Perform overall visual inspection of area to insure that all security and safety equipment is intact;
- Check area for standing water, sinkholes, erosion, etc.; and
- Inspect for signs of blowing solids particles.

1.5.3 Structures

• CSA Areas A and B – Asphalt Pads:

- Inspect asphalt pads for signs of physical deterioration or heave and subsidence.

• CAS Area C – Containment Sump and Concrete Pad:

- Inspect sump for physical deterioration, presence of liquids, or residual solids; and
- Inspect concrete pad for signs of physical deterioration or heave and subsidence.

• CSA Areas A, B, and C – Berms and Ditches:

- Check ditches and berms for deterioration that would allow runoff or run-on;
- Check ditches for physical obstructions; and
- Check berms for adequate grass or other stabilization medium.

• Site H LTU – Leachate Collection System, Leak Detection System, Stormwater Pond, Stormwater Pump, Berms, Ditches, and Monitor Wells:

- Check for presence of liquids in cleanout access of leachate collection system;
- Check liquid level in stormwater pond;
- Check gravity drain in stormwater pond for debris;
- Check water level in wet well to insure that level-activated pump is operating properly;
- Check ditches and berms for deterioration that would allow runoff or run-on;
- Check ditches for physical obstructions;
- Check berms for adequate grass or other stabilization medium/materials;
- Check for presence of liquids in leak detection system riser pipes;
- Check locks on monitor wells;
- Check for damage or missing protective casings on monitor wells; and
- Check for damage to concrete pads or for erosion around pads at the monitor wells.

1.6 Inspection Frequencies

All mobile equipment inspection items will be checked off, on a monthly basis, at a minimum. All areas and structures will be inspected on a monthly basis and after storm events.

1.7 Inspection Forms

All inspections of mobile equipment used at the CSA will be recorded on a form similar to that presented as Figure III.D-1. Inspections for areas and structures within the CSA will be recorded on forms similar to those presented as Figures III.D-2 and III.D-3, respectively. Inspections for *areas* and structures within the Site H LTU will be recorded on forms similar to those presented as Figures III.D-4 and III.D-5, respectively.

These inspections will be conducted by personnel designated by the Environmental Group and will be kept on file at the Fina facility for a period of three years from the date of inspection. An inspection log book will be kept on-site that consists of the collective inspection forms previously completed as well as documentation of remedial action.

Any deterioration or malfunction that is identified as a result of an inspection will be dealt with on a schedule that ensures that the problem will not pose an environmental/human health hazard. When a hazard is imminent or has already occurred, remedial action will be taken immediately.

TABLES

Table III.D-1 Hazardous Wastes and Management Activities

Table III.D-1
Hazardous Wastes and Management Activities

Verbal Description of Waste	TX Form Code	EPA Form Code	Source Code	TCEQ Waste Code & Waste Class	EPA Hazardous Waste Code	Waste Management Activities				Annual Quantity Generated and/or Received[3] (tons)	SIC Code and Process
						Off-Site	On-Site				
						Disposal	Storage[(1)]	Processing[(2)]	Disposal		
Chromium-Contaminated Soil	302	W301	G32	0006302H	D007	X	X			0.00	2911 Petroleum Refining
Spent Filters with benzene	310	W310	G16	0008310H	D018	X	X			0.00	2911 Petroleum Refining
Heat Exchanger Bundle Cleaning Sludge	695	W609	G13	0010695H	K050	X	X			65.71	2911 Petroleum Refining
Spent Caustic Solution in Water	110	W110	G08	0014110H	D002		X		WWTP	0.00	2911 Petroleum Refining
Filter Media from Aromex Unit	489	W319	G07	0018489H	D018		X			0.00	2911 Petroleum Refining
Computer Monitors, Keyboards, Circuit Boards, Circuit board casings & Containers that came in contact with battery	309	W309	G16	0019309H	D007, D008, D009	X				0.00	2911 Petroleum Refining
Tank Bottom cleanout scale & solids	489	W319	G14	0023489H	D001, K169	X	X			10.90	2911 Petroleum Refining
Slop oil emulsion sludge from separation of recoverable oil	603	W603	G09	0027603H	K049		X		WWTP	0.00	2911 Petroleum Refining
Concentrated aqueous solution of off-spec Mercaptan & other organic liquids offspec or needing disposal	207	W219	G11	0043207H	D001	X				0.00	2911 Petroleum Refining
Merox Unit Disulfide Seperator material	489	W319	G07	0060489H	D018		X			0.00	2911 Petroleum Refining
Petroleum contaminated Solids	289	W289	G32	0074289H	D018	X				26.02	2911 Petroleum Refining
Primary oil/water/solids separation sludge (dewatered)	319	W319	G25	0075319H	F037		X		WWTP	197.17	2911 Petroleum Refining
Spent carbon	404	W310	G49	0100404H	D018	X	X			0.00	2911 Petroleum Refining
Gasoline Filters, material containing benzene	310	W219	G07	0110310H	D001, D018	X	X			0.61	2911 Petroleum Refining
Crude oil tank bottoms	489	W319	G14	0113489H	D018, K169	X	X			0.00	2911 Petroleum Refining
Clarified slurry oil tank sediment	489	W319	G14	0114489H	K170		X			0.00	2911 Petroleum Refining
Tetraethylene Glycol solvent containing benzene and toluene	489	W219	G13	0116489H	D001, D018		X			0.00	2911 Petroleum Refining
Tank Bottom Sludge from Tank Cleanouts	695	W609	G14	0123695H	D018	X	X			112.45	2911 Petroleum Refining
Waste paint and paint related material (ignitable)	209	W209	G11	0129209H	DOO1, D035, F005	X	X			0.00	2911 Petroleum Refining
Spent Catalyst Co/Ni/Mo on Alumina	393	W319	G08	0135393H	D001, D003, D004	X	X			0.00	2911 Petroleum Refining

Table III.D-1
Hazardous Wastes and Management Activities

Verbal Description of Waste	TX Form Code	EPA Form Code	Source Code	TCEQ Waste Code & Waste Class	EPA Hazardous Waste Code	Waste Management Activities				Annual Quantity Generated and/or Received[3] (tons)	SIC Code and Process
						Off-Site	On-Site				
						Disposal	Storage[(1)]	Processing[(2)]	Disposal		
Spent Hydrotreating Catalyst	393	W319	G08	0138393H	K171	X	X			191.66	2911 Petroleum Refining
Primary/Secondary oil/water/solid separator wastewater sludge	319	W319	G23	0140319H	F037, F038	X				0.00	2911 Petroleum Refining
Non-Acute Hazardous Chemical Lab Waste	003	W001	G11	0144003H	D001, D002, D003, D006, D007, D008, D009, D011, F003, F005	X	X			0.17	2911 Petroleum Refining
Petroleum contaminated soils exhibiting the characteristics of ignitability	489	W301	G13	0155489H	D001		X			0.00	2911 Petroleum Refining
Chromium contaminated metal scale, filings, scrap, or blast material	307	W307	G13	0171307H	D007	X	X			0.00	2911 Petroleum Refining
DGA filter, material containing benzene	489	W219	G07	0200489H	D018	X	X			7.04	2911 Petroleum Refining
SCOTT Quench Filters	489	W219	G07	0300489H	D018	X	X			3.32	2911 Petroleum Refining
DHT filters with high concentration of H2S	801	W310	G13	0500801H	U135	X	X			0.00	2911 Petroleum Refining
Waste resulting from neutralization activites in the Alky Unit	110	W110	G32	0501110H	D002	X	X			0.00	2911 Petroleum Refining
Dry/Slurry metal hydroxide such as KOH that is off-spec or from an onsite process or service activity	305	W316	G11	0568305H	D002		X			17.24	2911 Petroleum Refining

[1] "Storage" means the holding of solid waste for a temporary period, at the end of chich the waste is processed, disposed of, or stored elsewhere

[2] "Processing" means the extraction of materials, transfer, volume reduction, conversion to energy, or other separation and preparation of solid waste for reuse or disposal, including the treatment or neutralization of hazardous waste, designed to change the physical, chemical, or biological character or composition of any hazardous waste so as to neutralize such waste, or so as to recover energy or material from the waste or so as to render such waste non-hazardous or less hazardous; safer for transport, store or dispose of; or amenable for recovery, amenable for storage, or reduced in volume. The "transfer" of solid waste for reuse or disposal as used above, does not include the actions of a transporter in conveying or transporting solid waste by truck, ship, pipeline, or other means. Unless the Executive Director determines that regulation of such activity is necessary to protect human health or the environment, the definition of "processing" does not include activities relating to those materials exempted by the Resource Conservation and Recovery Act, 42 USC §6901 et seq, as amended.

[3] Represents quantity generated and/or received during 2022.

FIGURES

- Figure III.D-1 Mobile Equipment Inspection Form
- Figure III,D-2 Area Inspection Form for Container Storage Area (Areas A, B, and C)
- Figure III.D-3 Structures Inspection Form for Container Storage Area (Areas A, B, and C)
- Figure III.D-4 Area Inspection Form for Site H Land Treatment Unit
- Figure III.D-5 Structures Inspection Form for Site H Land Treatment Unit

Figure III.D-1
Mobile Equipment Inspection Form

DATE: _____
INSPECTOR: _____
WEATHER CONDITIONS: _____

Item	STATUS Satisfactory	STATUS Unsatisfactory	Action Required
VACUUM TRUCK:			
Check tire pressure by pressure gauge and adjust as needed			
Check all fluid levels			
Check vacuum hoses for leaks & worn couplings			
Check vacuum pump for seal leakage			
Check vacuum truck tank vessel and all fittings to assure leak-free operation			
DUMP TRUCK			
• Check tire pressure by pressure gauge and adjust as needed			
• Check all fluid levels			
• Check all hydraulic hoses for leaks in hose and couplings			
• Inspect bed dump mechanism and lubricate as needed			

Figure III.D-1 (continued)
Mobile Equipment Inspection Form

DATE: _____
INSPECTOR: _____
WEATHER CONDITIONS: _____

Item	STATUS Satisfactory	STATUS Unsatisfactory	Action Required
DUMPSTER TRUCK:			
Check tire pressure by pressure gauge and adjust as needed			
Check all fluid levels			
Check hydraulic hoses for leaks in hose and couplings			
Inspect dumpster hydraulic lift mechanism as needed			
FRONT-END LOADER			
• Check tire pressure by pressure gauge and adjust as needed			
• Check all fluid levels			
• Check all hydraulic hoses for leaks in hose and couplings			
• Inspect bed loading mechanism and lubricate as needed			

Figure III.D-1 (continued)
Mobile Equipment Inspection Form

DATE: _____
INSPECTOR: _____
WEATHER CONDITIONS: _____

Item	STATUS Satisfactory	STATUS Unsatisfactory	Action Required
FORKLIFT:			
Check tire pressure by pressure gauge and adjust as needed			
Check all fluid levels			
Check hydraulic hoses for leaks in hose and couplings			
Inspect forklift mechanism & lubricate as needed			
FLAT-BED TRUCK			
• Check tire pressure by pressure gauge and adjust as needed			
• Check all fluid levels			
• Inspect side rails and back gate of bed to assure no loss of waste during transport			

Figure III.D-1 (continued)
Mobile Equipment Inspection Form

DATE: _____
INSPECTOR: _____
WEATHER CONDITIONS: _____

Item	STATUS Satisfactory	STATUS Unsatisfactory	Action Required
TRACTOR/DISK:			
Check tire pressure by pressure gauge and adjust as needed			
Check all fluid levels			
Inspect disk connection mechanism and disk for signs of excessive mechanical wear			
BULLDOZER:			
• Check tracks for smooth movement over guide wheels and lubricate as needed			
• Check all fluid levels			
• Inspect front blade lift mechanism			
• Inspect hydraulic cylinders, hoses, and couplings			

Figure III.D-2
Area Inspection Form for Container Storage Areas (Areas A, B, and C)

DATE: _____
INSPECTOR: _____
WEATHER CONDITIONS: _____

Item	STATUS Satisfactory	STATUS Unsatisfactory	Action Required
Inspect for drum leaks			
Check for deterioration as a result of corrosion			
Insure that all lids and bungs are in place			
Check to verify that all drums are on pallets			
Inspect conditions of pallets			
Check for standing water			
• Perform overall visual inspection of area to ensure that all security and safety equipment is intack			
• Inspect drums for proper label completion and placement			
• Inspect drums for proper placement in the storage unit			

Figure III.D-2 (continued)
Area Inspection Form for Container Storage Areas (Areas A, B, and C)

DATE: _____
INSPECTOR: _____
WEATHER CONDITIONS: _____

Item	STATUS		Action Required
	Satisfactory	Unsatisfactory	
Check contents against past records to ensure that internal manifest procedures are followed			
For drums shipped offsite, check completion of manifest forms and adherence to overall HWM manifest procedures for offsite disposal			

Figure III.D-3
Structures Inspection Form for Container Storage Areas (Areas A, B, and C)

DATE: _____
INSPECTOR: _____
WEATHER CONDITIONS: _____

Item	STATUS		Action Required
	Satisfactory	Unsatisfactory	
Inspect asphalt pads at Areas A and B for signs of physical deterioration or heave and subsidence			
Inspect containment sump at Area C for signs of physical deterioration, standing water, or residual solids			
Inspect concrete pad at Area C for signs of physical deterioration or heave and subsidence			
Check ditches and berms at Areas A, B, and C for signs of deterioration that would allow runoff			
Check ditches at Areas A, B, and C for physical obstructions			
Check berms at Areas A, B and C for adequate grass or other stabilization medium			

Figure III.D-4
Area Inspection Form for Site H Land Treatment Unit

DATE: _____
INSPECTOR: _____
WEATHER CONDITIONS: _____

Item	STATUS Satisfactory	STATUS Unsatisfactory	Action Required
Perform overall visual inspection of area to insure that all security and safety equipment is intact			
Check area for standing water, sinkholes, erosian, etc.			
Inspect for signs of blowing solids particles			
Inspect for damage to monitor well locks			
Inspect for damage to the protective casing on monitor wells			
Inspect for cracks in contrete pads at monitor wells			

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Figure III.D-5
Structures Inspection Form for Site H Land Treatment Unit

DATE: _____
INSPECTOR: _____
WEATHER CONDITIONS: _____

Item	STATUS		Action Required
	Satisfactory	Unsatisfactory	
Check ditches and berms for deterioration that would allow runoff or run-on			
Check ditches for physical obstructions			
Check berms for adequate grass or other stabilization medium/materials			
Check for presence of liquids in cleanout access of leachate collection system			
Check for presence of liquids in leak detection system riser pipes			
Check liquid level in stormwater pond			
Check gravity drain in stormwater pond for debris			
Check water level in wet well to insure that level-activated pump is operating properly			

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Table III.D- Inspection Schedule

Facility Unit(s) and Basic Elements	Possible Error, Malfunction, or Deterioration	Frequency of Inspection
Container Storage Area (Areas A, B, & C.) (Active)	Leaking drums, deteriorating pallets, presence of standing water, rusty drums, misplacement of drums, improperly working security and safety equipment, improper drum labeling, deteriorating asphalt pads, sump deterioration, presence of liquids or residual solids, deteriorating ditches and berms, physical obstructions in ditches, inadequate stabilization medium on berms.	Monthly and after storm events
Site H LTU (Closed)	Standing water, sinkholes, signs of blowing solids particles from LTU, improperly working security and safety equipment, improperly working leachate collection system, debris in storm water drain, improper water level in wet-well, deterioration of berms and ditches, physical obstructions in ditches, no locks on monitor wells, damage to monitor wells.	Quarterly and after storm events
Site E LTU (Closed)	Cover erosion, ponded water, settlement, sloughing of slopes, monitor well damage, damaged or missing monuments, blocked drainage channels	Quarterly and after storm events

Alon USA, LP
Alon USA Big Spring Refinery
Big Spring, TX

Hazardous Waste Permit 50140 - Part B
Application SWR No. 30083 / RN100250869 / CN600881783

SECTION III
APPENDIX III.E.
CONTINGENCY PLAN

Alon USA LP

CONTINGENCY PLAN
Appendix III.E.

Alon USA Big Spring Refinery
Big Spring, Texas, Howard County
HWP 20140 / ISW 30083
EPA ID TXD00813468

March 2024

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Attachment III.E-A Letters Documenting Notification of Local Authorities

SECTION 1 CONTINGENCY PLAN

The Alon Refinery in Big Spring, Texas generates hazardous wastes which are ~~disposed of onsite or~~ stored onsite and shipped offsite for disposal. No hazardous waste is disposed of on-site. The purpose of this contingency plan is to describe procedures necessary to minimize hazards to human health and the environment in the event of a fire, explosion, or unplanned release of hazardous waste of waste constituents.

The plan describes specific actions to be taken by facility personnel in the event of a fire, explosion, or release. It designates primary emergency personnel and lists emergency equipment and phone numbers. All emergency response personnel are familiar with this plan, and copies are available to assist external agencies in the decision-making process during an emergency.

1.1 Hazardous Wastes Managed at Alon

Alon generates the hazardous wastes listed in Table III.E-1. The various wastes generated by Alon are hazardous for the following reasons:

- Toxicity (EPA listed wastes);
- Ignitability (flashpoint <140oF)
- EP Toxicity for arsenic or chromium (>5.0 mg/L arsenic or chromium in leachate); and
- Sulfide reactivity (forms toxic H2S gas when exposed to acidic conditions).

Ignitable wastes pose a fire hazard. Wastes that are EP Toxic for metals primarily pose hazards when ingested and are considered dangerous due to the possibility of ground-water contamination that could result from a release of the waste. Wastes hazardous due to sulfide reactivity can generate hydrogen sulfide gas when exposed to acidic conditions. Hydrogen sulfide gas is highly toxic and exposure to low concentrations can cause irritation of mucous membranes. When inhaled in high concentrations, it can be fatal.

1.2 Emergency Coordinator

The Emergency Coordinator has the responsibility of coordinating all emergency response activities. A person designated to serve as Emergency Coordinator is available on the facility premises or on call 24-hours a day. All Emergency Coordinators are familiar with the following:

- All aspects of the facility's Contingency Plan;
- Operations and activities at the facility;
- Location and characteristics of all wastes handled;
- Location of all records within the facility; and
- Facility layout.

All designated Emergency Coordinators have the authority to commit the necessary resources in order to implement the Contingency Plan effectively and promptly.

The following persons are designated to serve as Emergency Coordinators:

Primary Emergency Coordinator	Alternate Emergency Coordinators
Title: Shift Foreman/Supervisor Names: Ryan Kelly, Sylis Kariah, Chris Helgeson, Brian Alexander Office Phone: 432/935-9155 Cell Phone: 432/935-9155	Refinery General Manager Name: Jeffrey Rose Office Phone: 970/562-1295 Cell Phone: 970/462-1295

A listing of additional emergency response personnel is provided in Table III.E-2.

1.3 Arrangements With Local Authorities

Arrangements have been made to familiarize the City of Big Spring Fire Department, the City of Big Spring Police Department, and the Department of Public Safety in Big Spring, Texas with the following:

- The layout of the facility;
- Properties of hazardous waste handled at the facility and associated hazards;
- Places where facility personnel are normally working;
- Entrances to and roads within the facility; and
- Possible evacuation routes.

Hospitals have been informed of the properties of hazardous waste handled at the facility and the types of injuries or illnesses that could result from fires, explosions, or releases at the facility.

Documentation of the notification of the above authorities is included in Attachment III.E-A. Table III.E-3 contains a list of local emergency contacts.

1.4 Emergency Equipment

Figure III.E-1 shows the locations of emergency equipment. A list of emergency equipment available for use in the Container Storage Area, the Site E Land Treatment Unit (Site E LTU), and the Site H Land Treatment Unit (Site H LTU) is included as Table III.E-4. Due to the remote location and open air nature of these areas, emergency response teams will rely primarily on mobile and portable equipment.

1.5 Evacuation Plan

This evacuation plan deals only with the evacuation of personnel from the Container Storage Area, the Site E LTU, and the Site H LTU. Key supervisory personnel carry two-way radios. The alarm signal for evacuation will be sounded via the facility alert speakers and given using the radios as well as transmitted verbally to any personnel not carrying communication devices.

For the waste management areas that are not enclosed, evacuation can be made quickly in any direction by any route. Employees should evacuate in the upwind direction of a fire or release if possible.

Primary designated assembly locations for evacuation are shown in Figure III.E-2. Evacuating personnel should proceed to the assembly locations so that emergency personnel can account for all employees known to be in the area and so that further instructions can be issued. If, because of the emergency, the primary assembly locations are inaccessible, personnel should collect upwind of the waste management area and out of the way of emergency response activities.

At the sounding of the alarm, all plant personnel not involved with emergency response activities must avoid the area of the emergency and remain alert for potential evacuation of other areas. Notification for evacuation will be provided by use of two-way radios and pagers.

1.6 Aisle Space

Sufficient aisle space is maintained in the Container Storage Area to allow for the unobstructed movement of personnel and emergency equipment.

1.7 Copies of and Amendments to the Contingency Plan

Copies of the Contingency Plan and all revisions will be maintained at the facility and submitted to the local police department, sheriff's department, Department of Public Safety, fire department, hospitals, and ambulance services.

The Contingency Plan will be reviewed and amended, if necessary, whenever:

- The facility permit is revised;
- The plan fails in an emergency;
- The facility changes its design, construction, operation, or maintenance in a way that increases the potential for fire, explosion, releases or changes the response necessary in an emergency;
- The list of Emergency Coordinators changes; and
- The list of emergency equipment changes.

1.8 Emergency Procedures

1.8.1 General

An employee detecting a fire, explosion, leak or spill will immediately notify the shift foreman. The employee will inform the foreman of the location, nature, and extent of the problem. The foreman will call the Emergency Coordinator and the emergency response team.

The employee(s) detecting the problem will, if appropriate, attempt to remediate or contain the situation until help arrives. The Shift Foreman will make decisions until the Emergency Coordinator takes over.

The Emergency Coordinator will proceed to the scene of the emergency and assess the possible hazards to human health or the environment that may result from the release, fire, or explosion. The assessment will consider both direct and indirect effects of the emergency including the effects of any toxic, irritating, or asphyxiating gasses that are generated or the effects of any hazardous surface water runoff from water or chemical agents used to control fire and heat induced explosions.

Based on this assessment, the Emergency Coordinator will determine the need to evacuate the plant and/or surrounding areas and determine whether outside help is required and whether local authorities should be contacted.

The Emergency Coordinator will direct the activities of the response teams and be available to advise local authorities of the situation.

In the event of a major disaster, a Control Center will be established at the Shift Foreman's office or in an alternate location designated by the Emergency Coordinator. The Control Center will be equipped with two-way radios and telephones. Response teams will report to the Control Center to receive further emergency response instructions.

A secondary control station can be established near the scene of the emergency by locating a specially equipped trailer in a safe area. The trailer has a P.A. system and contains protective clothing, fire equipment, and breathing equipment.

Once the situation has been remediated, the Emergency Coordinator is responsible for the removal and proper disposition of any waste generated during the cleanup process. This includes making a hazardous waste determination as required by 40 CFR §262.11 and disposing of the waste properly.

1.8.2 Response to Fire or Explosion

An employee detecting a fire or explosion will immediately notify their shift foreman. The employee will inform the foreman of the location, nature, and extent of the problem. The foreman will call the Emergency Coordinator and the emergency response team.

The employee(s) detecting the problem will, if appropriate, attempt to remediate or contain the situation until help arrives. The Shift Foreman will make decisions until the Emergency Coordinator takes over.

The Emergency Coordinator and the designated response team(s) will proceed to the site of the emergency. The response team will wear protective equipment as instructed by the Emergency Coordinator.

Once on the scene, the Emergency Coordinator will assess the situation considering the following:

- The nature of the immediate emergency (fire, explosion);
- The character of the waste involved;
- Whether water or chemical is necessary to fight the fire;
- The areal extend of the fire; and

- The potential for further spread.

The Emergency Coordinator must also assess the potential consequences of the emergency both direct and indirect to human health and the environment. The assessment must consider the following:

- Whether any waste is likely to explode or whether any waste not already burning will readily ignite;
- Whether any toxic, irritating, or asphyxiating gasses will be generated if a particular waste is exposed to heat or flame; and
- Whether any water or chemical agents used to fight a fire could carry hazardous constituents from the area as runoff.

The Emergency Coordinator will direct the response operations. Based on the above assessment, the Emergency Coordinator will decide:

- Whether any areas of the facility should be evacuated. If evacuation is necessary, he will contact the guard at the main gate who will five the notification by two-way radio and pager;
- What personnel protective equipment is needed. If needed, he will contact the guard at the main gate by two-way radio and give directions;
- What containment is needed to control runoff from fire fighting efforts. A contractor is on call to construct temporary earthen dike if so directed.
- What actions should be taken in nearby areas of the facility to prevent the spread of fire or further explosions;
- Whether a Control Center should be established; and
- Whether outside help should be summoned. If so, he will contact the guard at the main gate and give directions and details.

The Emergency Coordinator will direct support personnel to remove or isolate any waste containers from the area of the fire to prevent the spread of fire, further explosions, or the release of waste.

If it is determined that human health or the environment outside the facility may be affected or it appears that areas outside the facility may need to be evacuated, the Emergency Coordinator will contact the following agencies:

- Howard County Sheriff Department;
- Texas Department of Public Safety;
- Big Spring Police Department;
- Big Spring Fire Department;
- Texas Commission on Environmental Quality (TCEQ) Region 7, ClayDesta Plaza, 10 Desta Drive, Suite 350E, Midland, Texas 79705, 432/570-1359; and
- National Response Center at 800/424-8802 or the EPA Region VI Dallas Federal On-Scene Coordinator at 214/655-2222.

The report to the above authorities must include:

- Name and telephone number of the reporter;
- Time and type of incident (e.g., fire, explosion);
- Name and quantity of material(s) involved, to the extent known at the time;
- The extent of injuries, if any; and
- The possible hazards to human health and/or the environment outside the facility.

Once the fire has been extinguished, the Emergency Coordinator will direct the cleanup of any waste or contaminated water released during the fire or fire response. Water will be pumped into the wastewater treatment system upstream of the API separator. Oil and viscous liquids will be covered with absorbent material. Contaminated soil will be excavated. Contaminated soil and absorbent material will be placed in roll-off boxes or drummed for shipment offsite for proper disposal.

Before operations are resumed, the Emergency Coordinator and other facility personnel will investigate the cause of the fire or explosion and take measures to ensure that a similar accident will not occur.

Before operations in the affected area are resumed, all emergency equipment will be cleaned and refit for use. Fire extinguishers must be refilled and inspected. Any equipment that came in contact with waste or contaminated water or soil will be rinsed or seam cleaned, and the cleaning water discharged to the wastewater treatment system upstream of the API separator. Any equipment that failed or was damaged during the emergency will be repaired or replaced.

Following remediation of the emergency, the EPA Region VI in Dallas and the TCEQ Region 7 Office in Midland will be notified as to the disposition of wastes generated during the emergency and that the emergency equipment is operable.

With fifteen (15) days of the incident, a report must be submitted to the TCEQ, Emergency Response Unit and a notation must be made in the operating record as described in Subsection 1.8.4.

1.8.3 Response to Spill or Release

An employee detecting a leak or spill will immediately notify their shift foreman. The employee will inform the foreman of the location, nature, and extend of the problem. The foreman will call the Emergency Coordinator and the emergency response team.

The employee(s) detecting the problem will, if appropriate, attempt to remediate or contain the situation until help arrives. The shift foreman will make decisions until the Emergency Coordinator take over.

The Emergency Coordinator and the designated response team(s) will proceed to the site of the emergency. The response team will wear protective equipment as specified by the

Emergency Coordinator. Once on the scene, the Emergency Coordinator will assess the situation, considering the following:

- The nature of the immediate emergency;
- The character of the waste involved;
- The approximate amount of waste involved;
- The exact source of the release;
- The cause of the release;
- The areal extent of the release;
- The potential for further release; and
- The direction and pathway flow of the released material.

The Emergency Coordinator must also assess the potential consequences of the release, both direct and indirect, to human health and the environment. This assessment must consider the following:

- The chemical nature of the waste and its effect on the environment;
- The potential of the waste to react upon contact with surface water;
- The possibility that spilled waste will migrate beyond the facility boundaries; and
- The potential for ground-water contamination.

The Emergency Coordinator will then direct the response operation. Based on the above criteria, he will make the following decisions:

- Whether any areas of the facility should be evacuated;
- If additional in-house support or equipment is needed, he will contact the guard at the main gate by two-way radio;
- What personnel protective equipment is necessary;
- Whether outside help should be summoned. If so, he will contact the guard at the main gate and give details;
- Whether containers of wase incompatible with the spilled material should be removed or isolated;
- What methods should be used to clean up the spilled material; and
- Whether a control center should be established.

In the unlikely event that there is an uncontrolled release or spill, the Emergency Coordinator will direct the construction of earthen dikes to contain the spill. Soil is available from borrow pits on the facility property. The spill material would be absorbed using either soil or absorbent material. The source of the spill will be located and, if continuing, action will be taken to prevent further release of materials.

Once the spill has been stopped at the source and the released material contained, the Emergency Coordinator will direct the cleanup of the spilled material and contaminated soils. A vacuum truck may be used to remove liquids if the spill is large. Contaminated absorbent soil and diking materials will either be placed in a temporary lined constructed containment area or drummed and sent to the Container Storage Area, depending on the type and volume of the material spilled and soil impacted.
Contaminated water will be discharged to the wastewater treatment system upstream of the API separator.

If it is determined that human health or the environment outside the facility may be affected or it appears that areas outside the facility may need to be evacuated, the Emergency Coordinator will contact the following agencies:

- Howard County Sheriff Department;
- Texas Department of Public Safety;
- Big Spring Police Department;
- Big Spring Fire Department;
- Texas Commission on Environmental Quality (TCEQ) Region 7, ClayDesta Plaza, 10 Desta Drive, Suite 350E, Midland, Texas 79705, 432/570-1359; and
- National Response Center at 800/424-8802 or the EPA Region VI Dallas Federal On-Scene Coordinator at 214/655-2222.

The report to the above authorities must include:

- Name and telephone number of the reporter;
- Time and type of incident (e.g., spill or leak);
- Name and quantity of material(s) involved, to the extent known at the time;
- The extent of injuries, if any; and
- The possible hazards to human health and/or the environment outside the facility.

Before operations are resumed, the Emergency Coordinator and other plant personnel will investigate the cause of the leak or spill and take measures to prevent a similar emergency in the future. Damaged containers, tanks, or transport vehicles must be replaced or repaired before further use. All emergency equipment must be cleaned and refit for use. Fire extinguishers must be refilled and inspected. Any equipment that came in contact with waste or contaminated water or soil will be rinsed or seam cleaned, and the cleaning water discharged to the wastewater treatment system upstream of the API separator. Any equipment that failed or was damaged during the emergency will be repaired or replaced.

Following remediation of the emergency, the EPA Region VI in Dallas and the TCEQ Region 7 Office in Midland will be notified as to the disposition of wastes generated during the emergency and that the emergency equipment is operable.

With fifteen (15) days of the incident, a report must be submitted to the TCEQ, Emergency Response Unit and a notation must be made in the operating record as described in Subsection 1.8.4.

If a spill or release is remediated promptly as described in this plan, ground-water contamination should not occur. If ground-water contamination does occur, the Emergency Coordinator will notify the TCEQ and begin remediation under the present corrective action program.

1.8.4 Reporting

If the Emergency Coordinator determines that the fire, explosion, or release could threaten human health or the environment outside the facility, the following organizations must be notified:

- Howard County Sheriff Department;
- Texas Department of Public Safety;
- Big Spring Police Department;
- Big Spring Fire Department;
- Texas Commission on Environmental Quality (TCEQ) Region 7, ClayDesta Plaza, 10 Desta Drive, Suite 350E, Midland, Texas 79705, 432/570-1359; and
- National Response Center at 800/424-8802 or the EPA Region VI Dallas Federal On-Scene Coordinator at 214/655-2222.

Following the remediation of the emergency, the Emergency Coordinator must issue a statement to the EPA Region VI and the TCEQ Region 7 offices that the emergency is remediated.

Within fifteen (15) days of an emergency for which the Contingency Plan was implemented, the Emergency Coordinator must submit a written report to:

Texas Commission on Environmental Quality
Emergency Response Unit
P.O. Box 13087
Austin, Texas 78711-3087

The report must include:

- Name, address, and telephone number of the owner or operator of the facilty;
- Name, address, and telephone number of the facility;
- Date, time, and type of incident;
- Name and quantity of material(s) involved;
- Extent of injuries, if any;
- Assessment of actual or potential hazards to human health or the environment; and

- Estimated quantity and disposition of recovered material that resulted from the incident.

A notation must be made in the facility operating record of the time, date, and details of any incident requiring implementation of the Contingency Plan.

TABLES

Table III.E-1 Hazardous Wastes and Management Activities
Table III.E-2 Emergency Response Personnel
Table III.E-3 Emergency Contacts
Table III.E-4 Emergency Equipment

Table III.E-1
Hazardous Wastes and Management Activities

Verbal Description of Waste	TX Form Code	EPA Form Code	Source Code	TCEQ Waste Code & Waste Class	EPA Hazardous Waste Code	Waste Management Activities				Annual Quantity Generated and/or Received[3] (tons)	SIC Code and Process
						Off-Site	On-Site				
						Disposal	Storage[(1)]	Processing[(2)]	Disposal		
Chromium-Contaminated Soil	302	W301	G32	0006302H	D007	X	X			0.00	2911 Petroleum Refining
Spent Filters with benzene	310	W310	G16	0008310H	D018	X	X			0.00	2911 Petroleum Refining
Heat Exchanger Bundle Cleaning Sludge	695	W609	G13	0010695H	K050	X	X			65.71	2911 Petroleum Refining
Spent Caustic Solution in Water	110	W110	G08	0014110H	D002		X		WWTP	0.00	2911 Petroleum Refining
Filter Media from Aromex Unit	489	W319	G07	0018489H	D018		X			0.00	2911 Petroleum Refining
Computer Monitors, Keyboards, Circuit Boards, Circuit board casings & Containers that came in contact with battery	309	W309	G16	0019309H	D007, D008, D009	X				0.00	2911 Petroleum Refining
Tank Bottom cleanout scale & solids	489	W319	G14	0023489H	D001, K169	X	X			10.90	2911 Petroleum Refining
Slop oil emulsion sludge from separation of recoverable oil	603	W603	G09	0027603H	K049		X		WWTP	0.00	2911 Petroleum Refining
Concentrated aqueous solution of off-spec Mercaptan & other organic liquids offspec or needing disposal	207	W219	G11	0043207H	D001	X				0.00	2911 Petroleum Refining
Merox Unit Disulfide Seperator material	489	W319	G07	0060489H	D018		X			0.00	2911 Petroleum Refining
Petroleum contaminated Solids	289	W289	G32	0074289H	D018	X				26.02	2911 Petroleum Refining
Primary oil/water/solids separation sludge (dewatered)	319	W319	G25	0075319H	F037		X		WWTP	197.17	2911 Petroleum Refining
Spent carbon	404	W310	G49	0100404H	D018	X	X			0.00	2911 Petroleum Refining
Gasoline Filters, material containing benzene	310	W219	G07	0110310H	D001, D018	X	X			0.61	2911 Petroleum Refining
Crude oil tank bottoms	489	W319	G14	0113489H	D018, K169	X	X			0.00	2911 Petroleum Refining
Clarified slurry oil tank sediment	489	W319	G14	0114489H	K170		X			0.00	2911 Petroleum Refining
Tetraethylene Glycol solvent containing benzene and toluene	489	W219	G13	0116489H	D001, D018		X			0.00	2911 Petroleum Refining
Tank Bottom Sludge from Tank Cleanouts	695	W609	G14	0123695H	D018	X	X			112.45	2911 Petroleum Refining
Waste paint and paint related material (ignitable)	209	W209	G11	0129209H	DOO1, D035, F005	X	X			0.00	2911 Petroleum Refining
Spent Catalyst Co/Ni/Mo on Alumina	393	W319	G08	0135393H	D001, D003, D004	X	X			0.00	2911 Petroleum Refining

Table III.E-1
Hazardous Wastes and Management Activities

Verbal Description of Waste	TX Form Code	EPA Form Code	Source Code	TCEQ Waste Code & Waste Class	EPA Hazardous Waste Code	Waste Management Activities				Annual Quantity Generated and/or Received[3] (tons)	SIC Code and Process
						Off-Site	On-Site				
						Disposal	Storage[(1)]	Processing[(2)]	Disposal		
Spent Hydrotreating Catalyst	393	W319	G08	0138393H	K171	X	X			191.66	2911 Petroleum Refining
Primary/Secondary oil/water/solid separator wastewater sludge	319	W319	G23	0140319H	F037, F038	X				0.00	2911 Petroleum Refining
Non-Acute Hazardous Chemical Lab Waste	003	W001	G11	0144003H	D001, D002, D003, D006, D007, D008, D009, D011, F003, F005	X	X			0.17	2911 Petroleum Refining
Petroleum contaminated soils exhibiting the characteristics of ignitability	489	W301	G13	0155489H	D001		X			0.00	2911 Petroleum Refining
Chromium contaminated metal scale, filings, scrap, or blast material	307	W307	G13	0171307H	D007	X	X			0.00	2911 Petroleum Refining
DGA filter, material containing benzene	489	W219	G07	0200489H	D018	X	X			7.04	2911 Petroleum Refining
SCOTT Quench Filters	489	W219	G07	0300489H	D018	X	X			3.32	2911 Petroleum Refining
DHT filters with high concentration of H2S	801	W310	G13	0500801H	U135	X	X			0.00	2911 Petroleum Refining
Waste resulting from neutralization activites in the Alky Unit	110	W110	G32	0501110H	D002	X	X			0.00	2911 Petroleum Refining
Dry/Slurry metal hydroxide such as KOH that is off-spec or from an onsite process or service activity	305	W316	G11	0568305H	D002		X			17.24	2911 Petroleum Refining

[1] "Storage" means the holding of solid waste for a temporary period, at the end of chich the waste is processed, disposed of, or stored elsewhere

[2] "Processing" means the extraction of materials, transfer, volume reduction, conversion to energy, or other separation and preparation of solid waste for reuse or disposal, including the treatment or neutralization of hazardous waste, designed to change the physical, chemical, or biological character or composition of any hazardous waste so as to neutralize such waste, or so as to recover energy or material from the waste or so as to render such waste non-hazardous or less hazardous; safer for transport, store or dispose of; or amenable for recovery, amenable for storage, or reduced in volume. The "transfer" of solid waste for reuse or disposal as used above, does not include the actions of a transporter in conveying or transporting solid waste by truck, ship, pipeline, or other means. Unless the Executive Director determines that regulation of such activity is necessary to protect human health or the environment, the definition of "processing" does not include activities relating to those materials exempted by the Resource Conservation and Recovery Act, 42 USC §6901 et seq, as amended.

[3] Represents quantity generated and/or received during 2022.

Table III.E-2

EMERGENCY RESPONSE PERSONNEL

Incident Management Team Roster

POSITION	RESPONSE TIME (min.)	FIRST NAME	LAST NAME	WORK PHONE	CELL PHONE
Incident Commander	**30**	**Jeff**	**Rose**	**432-263-9505**	**907-750-4152**
Backup	30	John	Zalewsky	432-263-9505	313-269-6968
Deputy Incident Commander	**30**	**Sylis**	**Kariah**	**432-263-9505**	**340-277-0897**
Backup	30	Rich	Stemmer	432-263-9505	707-673-3686
Operation Section Chief	**30**	**Sylis**	**Kariah**	**432-263-9505**	**340-277-0897**
Backup	30	Rich	Stemmer	432-263-9505	707-673-3686
Planning Section Chief	**45**	**Aaron**	**Boucher**	**870-864-1177**	**713-518-4575**
Backup	45	Joe	Brewster	-	337-842-7732
Logistics Section Chief	**60**	**Steven (Buck)**	**Grigg**	**-**	**432-816-6039**
Backup		Patrick	Bunning	432-263-9232	432-269-0454
Finance Section Chief	**120**	**Shelley**	**Gray**	**432-263-9432**	**432-816-9545**
Backup	120	Patricia	Goodwin	-	903-497-2799
Public Affairs	**180**	**Marissa**	**Kollar**	**270-348-2681**	
Backup	180	Ryan	Smithson	270-348-2681	
Safety/Industrial Hygiene Officer	**30**	**Joel**	**Leonardi**	**432-210-0308**	**970-462-1295**
Backup	30	Sergio	Alvarado	-	9854022534
Fire Chief	**30**	**Joel**	**Leonardi**	**432-210-0308**	**970-462-1295**
Backup	30	Sergio	Alvarado	-	9854022534
Medical Unit Leader	**60**	**Byron**	**Lewis**	**432-263-9288**	**432-935-3636**
Backup	60	Core	Nurse	-	225-577-3146
Liaison & Environmental Officer	**60**	**Frank**	**Burgard**	**-**	**432-466-4632**
Backup	120	Nishanth(Nick)	Singh	-	361-228-0996
Production & Recoveyr Chief	**30**	**John**	**Zalewsky**	**432-263-9505**	**313-269-6968**
Backup	30	Richard	Stockton	-	432-213-0339
Disposal Specialist	**60**	**Nishanth(Nick)**	**Singh**	**-**	**361-228-0996**
Backup					
Enviromental Unit Leader	**30**	**Frank**	**Burgard**	**-**	**432-466-4632**
Backup	60	Nishanth(Nick)	Singh	-	361-228-0996
Documentation Unit	**60**	**Jessica**	**Rivera**	**432-263-9332**	**432-257-3992**
Backup					
Refinery Guides	**30**	**Gilbert**	**Hernandez**	**-**	**432-517-0412**
Backup	30	Trev	Larson	-	432-853-1443
Operations Branch	**30**	**Jeff**	**Rose**	**432-263-9505**	**907-750-4152**
Backup	30	John	Zalewsky	432-263-9505	313-269-6968
Field Supply	**30**	**Steven (Buck)**	**Grigg**	**-**	**432-816-6039**
Backup	30	Patrick	Bunning	432-263-9232	432-269-0454
Procurement Unit Leader	**30**	**Steven (Buck)**	**Grigg**	**-**	**432-816-6039**
Backup	30	Patrick	Bunning	432-263-9232	432-269-0454
Security / Communications	**30**	**Trey**	**McMillan**	**432-263-9263**	**832-716-5882**
Backup	30	Gina	Castillo	-	432-263-9218
IT / Systems Staff	**60**	**John**	**Reagan**	**432-263-9500**	**432-935-1406**
Backup	60	Jesse	Bravo	432-263-9229	432-770-4571
Finance Cost Unit	**120**	**Don**	**Rodgers**	**-**	**432-816-1134**
Backup	120	Don	Rodgers	-	432-816-1134
Staging Area Coordinator	**30**	**Gilbert**	**Hernandez**	**-**	**432-517-0412**
Backup	30	Trev	Larson	-	432-853-1443
Main Office Support	**60**	**Jessica**	**Rivera**	**432-263-9332**	**432-257-3992**
Backup					
Technical Support	**60**	**John**	**Reagan**	**432-263-9500**	**432-935-1406**
Backup	60	Jesse	Bravo	432-263-9229	432-770-4571
Head-Count Coordinator	**15**	**Marty**	**Rodgers**	**-**	**361-816-5086**
Backup	15	Gina	Castillo	-	432-263-9218

Table III.E-3

EMERGENCY CONTACTS
Outside Companies & Personnel

Allied Signal Chemical (HF Acid)	**800-622-5002**
Alon Pipeline Control Center	**432-264-5457**
Ambulance	**911**
Big Spring City Manager	**432-264-2401**
Big Spring Herald	**432-263-7331**
Big Spring Mayor	**432-263-4095**
Big Spring Police	**[911] 432-264-2559**
Clems Vacuum Trucks (Pager)	**432-267-0805**
Colorado River Municipal Water District	**432-267-0805**
El Paso Natural Gas Co. (Odessa Office)	**915-337-6000 [6]**
Fire Department	**911**
Howard County Fire Department	**911**
Howard County Judge	**432-264-2202**
Howard County Sheriff	**410-313-4150**
KBST Radio	**432-267-3095**
KBYG Radio	**432-263-5294**
OSHA lubbock	**800-692-4202**
Scenic Mountain Hospital	**432-263-1211**
Southwestern Bell Telephone	**800-286-8313**
Texas Department of Public Safety	**432-267-5671**
Texas Railroad Commission Midland	**915-284-5581**
Texas Utility Electric Company	**800-233-2133**
Union Pacific Railtoad Big Spring Dispatch	**432-267-6341**
Westar Natural Gas Company	**915-683-6171**

Table III.E-4

Emergency Equipment

Equipment	Location
WEST FIREHOUSE:	
1 - 1000 GPM Foam Pumper	East Door
1 - 500 GPM Pumper	West Door
2 - 1000 GPM Foam Monitors	West Floor
2 - 700 GPM Foam Monitors	West Floor
1 - 2000 GPM Foam Monitor	Southwest Floor
2 - 500 GPM Monitors	Back of 500 Pumper
3 - Foam Dollies	East Floor
1 - Hale Transfer Pump	Back of 500 Pumper
1 - Hale Transfer Pump	East Floor
2 Cairns 1 HR SCBA	Foam Pumper
1 - 2500 GPM Electric Pump	Auto / Manual
1 - 2500 GPM Diesel Pump	Manual
1 - 750 GPM Electric Pump	Auto / Manual
1 - 30 GPM Electric Pump	Pressure Controller
1 - Chlorine Repair Kit	Southeast Cabinet
1 - 1250 GPM Monitor	Back of 500 Pumper
EAST FIREHOUSE:	
1 - Equipment Trailer	West Door
2 - 500 GPM Monitors	Back of Equipment Trailer
10 - Cairns 1 Hour SCBA	Equipment Trailer
16 - Cairns 1 Hour SCBA	Equipment Trailer
1 - Hazmat Trailer	East Door
4 - Cairns 1 Hour SCBA	Hazmat Trailer
10 - Class B Suits	Hazmat Trailer
2 - Class A Suits	Hazmat Trailer
3 - 50-ft Water Hoses	Hazmat Trailer
3 - 110V Stand Lights	Hazmat Trailer
1 - Rescue Tripod	Hazmat Trailer
1 - Decon Shower	Hazmat Trailer
2 - Container Pigs	Hazmat Trailer
1 - Tool Kit	Hazmat Trailer
2 - 110V Extension Cords	Hazmat Trailer
2 - Decon Brushes	Hazmat Trailer
2 - Decon Buckets	Hazmat Trailer
1 - AM/FM Radio	Hazmat Trailer
1 - Cassette Recorder	Hazmat Trailer
2 - Round-Point Shovels	Hazmat Trailer
2 - Square Point Shovels	Hazmat Trailer
1 - Burn Pack	Hazmat Trailer
1 - O2 Bottle	Hazmat Trailer
2 - Class A Suits	Hazmat Trailer
1 - Over Pack Set	Hazmat Trailer
4 - Full Face OVAG	Hazmat Trailer
2 - 20 lbs Dry Chemical Fire Extinquisher	Hazmat Trailer
4 - Pair Rubber Boots	Hazmat Trailer
6 - Warning Cones	Hazmat Trailer
28 - 2 inch x 50 ft Hoses	West Rack
47 - 3 inch x 50 ft Hoses	West Rack
19 - 5 inch x 50 ft Hoses	West Rack

Table III.E-4

Emergency Equipment

Equipment	Location
EAST FIREHOUSE: *(continued)*	
15 - 2 inch x 50 ft Hoses	Equipment Trailer
6 - 3 inch x 50 ft Hoses	Equipment Trailer
46 - 5 Gallon Buckets AFFF	South Wall
18 - 5 Gallon Foam Stabilizers	South Wall
EMERGENCY RESPONSE TRUCK (1 ton):	
2 - Scott SKA Packs	Front Passenger
3 - Scott 2.2 SCBAs	Back Passenger
1 - Drum / Tank Repair Kit	Middle Passenger
1 - First Aid Kit	Middle Passenger
1 - 1.5 inch Foam Eductor	Middle Passenger
1 - 5 inch Stortz Adaptor	Middle Passenger
3 - 1 Hour Cairns SCBAs	Rear
1 - 1250 GPM Nozzle	Rear
Assorted Pigs	Rear
2 - Medium Size Proximity Suits	Back Driver
1 - Hazmat Pig Kit	Middle Driver
1 - Manual Compressor	Middle Driver
1 - Porta Power with Jaws	Middle Driver
1 - 3000 Watt Generator	Front Driver
1 - 50 GPM Hale Pump	Center Compartment
25 Gallons AFFF	Center Compartment
4 - 2 inch x 50 ft Hoses	Top Front
3 - 3 inch x 50 ft Hoses	Top Passenger
2 - 125 GPM Nozzles	Top Front
LARGE HOSE TRAILER:	
18 - 5 inch X 50 ft Hosft	Center Isle
4 - 5 inch x 25 ft Hoses	Center Isle
SMALL HOSE TRAILER:	
10 - 5 inch x 50 ft Hoses	Center Isle
FOAM TRAILER:	
2 - 500 gallon Tanks AFFF	Center Isle
1 - 500 gallon Tank	Center Isle
FOAM MONITOR TRAILER:	
200 gallons AFFF Foam	FCCU
6 - 2.5 inch x 50 ft Hoses	FCCU
6 - 1.75 inch x 50 ft Hoses	FCCU
1 - 500 GPM Foam Nozzle	FCCU
NORTHSIDE FIREHOUSE:	
1 - 2000 GPM Portable Pump	North wall
LUBE OIL WAREHOUSE	
220 - 50 gallon Barrels AFFF Foam	Northwest Area
4 - 305 gallon Totes	Southwest Area

FIGURES

Figure III.E-1 Locations of Emergency Equipment

Figure III.E-2 Primary Designated Assembly Locations For Evacuation

Figure III.E.1. (Sheet 1 of 18) [Base Map Insert Layout] Emergency Equipment Location

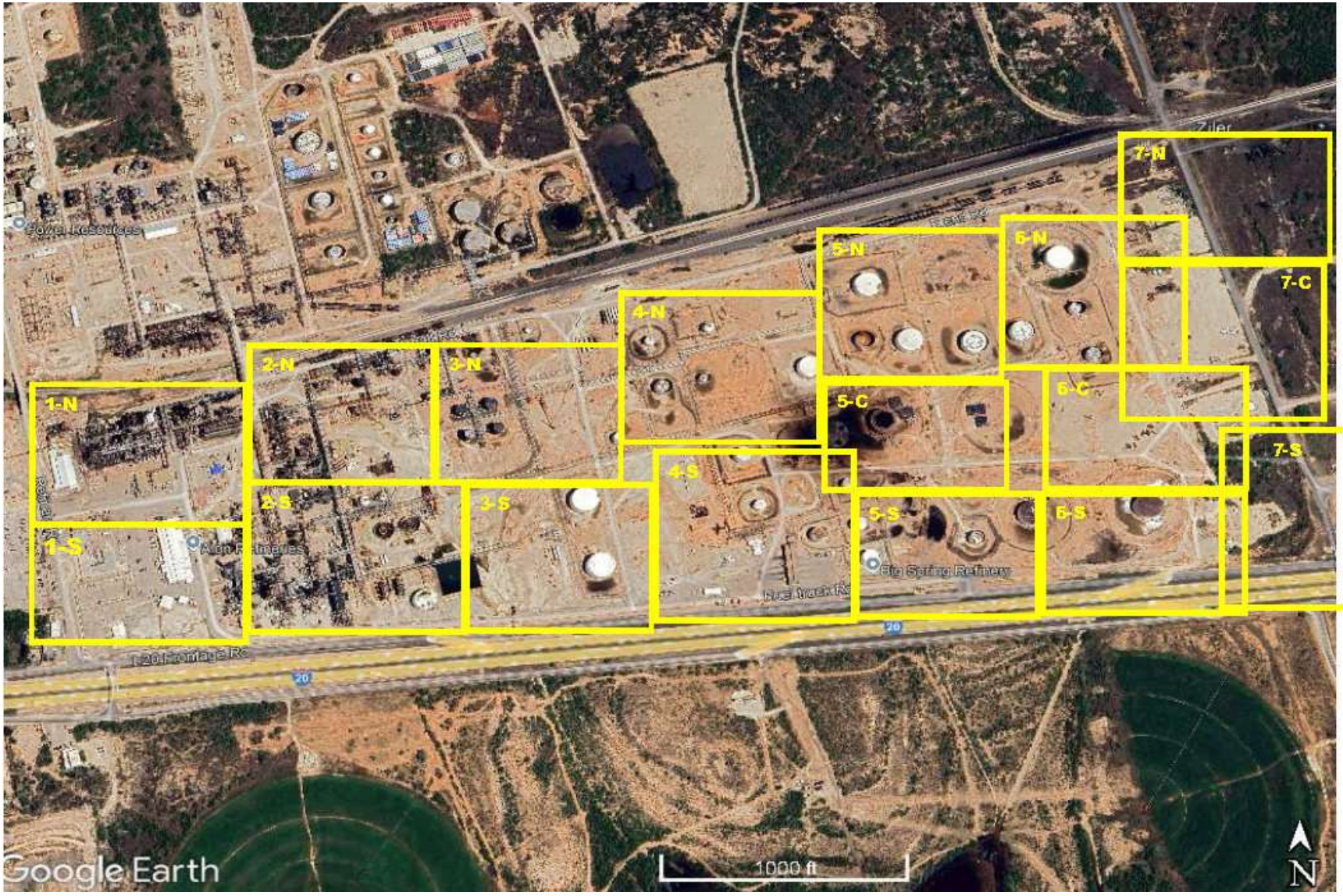


Figure III.E.1. (Sheet 2 of 18) [Insert 1-N] Emergency Equipment Location

⑦ - **Hydrant with Mounted Monitor**

Figure III.E.1. (Sheet 3 of 18) [Insert 1-S] Emergency Equipment Location

③-Fire Hydrant, ④-Fire Truck Station, ⑥-Foam Monitor with Drums, ⑦-Hydrant with Mounted Monitor, ⑧-Fire Water Pump House

Figure III.E.1. (Sheet 4 of 18) [Insert 2-N] Emergency Equipment Location

① - Deluge Sprinkler System, ⑦-Hydrant with Mounted Monitor

Figure III.E.1. (Sheet 5 of 18) [Insert 2-S] Emergency Equipment Location

⑦ - **Hydrant with Mounted Monitor**

Figure III.E.1. (Sheet 6 of 18) [Insert 3-N] Emergency Equipment Location

① - Deluge Sprinkler System, ⑥ - Foam Monitor with Drum, ⑦ - Hydrant with Mounted Monitor

Figure III.E.1. (Sheet 7 of 18) [Insert 3-S] Emergency Equipment Location

⑦ - Hydrant with Mounted Monitor

Figure III.E.1. (Sheet 8 of 18) [Insert 4-N] Emergency Equipment Location

① - Deluge Sprinkler System, ⑥ - Foam Monitor with Drum

Figure III.E.1. (Sheet 9 of 18) [Insert 4-S] Emergency Equipment Location

① - Deluge Sprinkler System, ③ - Fire Hydrant, ⑥ - Foam Monitor with Drum

Figure III.E.1. (Sheet 10 of 18) [Insert 5-N] Emergency Equipment Location

③ - Fire Hydrant

Figure III.E.1. (Sheet 11 of 18) [Insert 5-C] Emergency Equipment Location

③ - Fire Hydrant

Figure III.E.1. (Sheet 12 of 18) [Insert 5-S] Emergency Equipment Location

③ - Fire Hydrant

Figure III.E.1. (Sheet 13 of 18) [Insert 6-N] Emergency Equipment Location

③ - Fire Hydrant

Figure III.E.1. (Sheet 14 of 18) [Insert 6-C] Emergency Equipment Location

③ - Fire Hydrant

Figure III.E.1. (Sheet 15 of 18) [Insert 6-S] Emergency Equipment Location

③ - Fire Hydrant

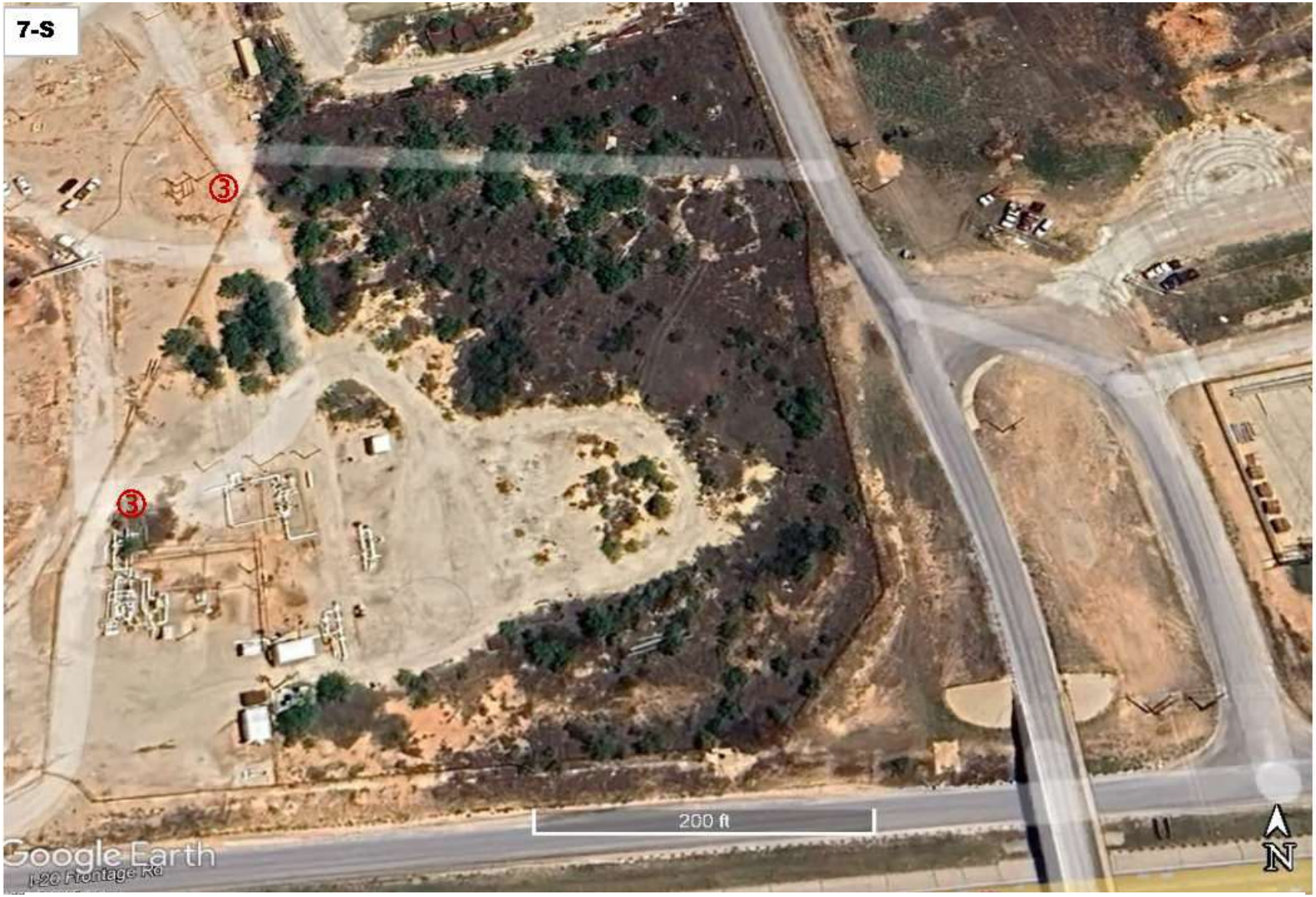
Figure III.E.1. (Sheet 16 of 18) [Insert 7-N] Emergency Equipment Location

③ - Fire Hydrant

Figure III.E.1. (Sheet 17 of 18) [Insert 7-C] Emergency Equipment Location

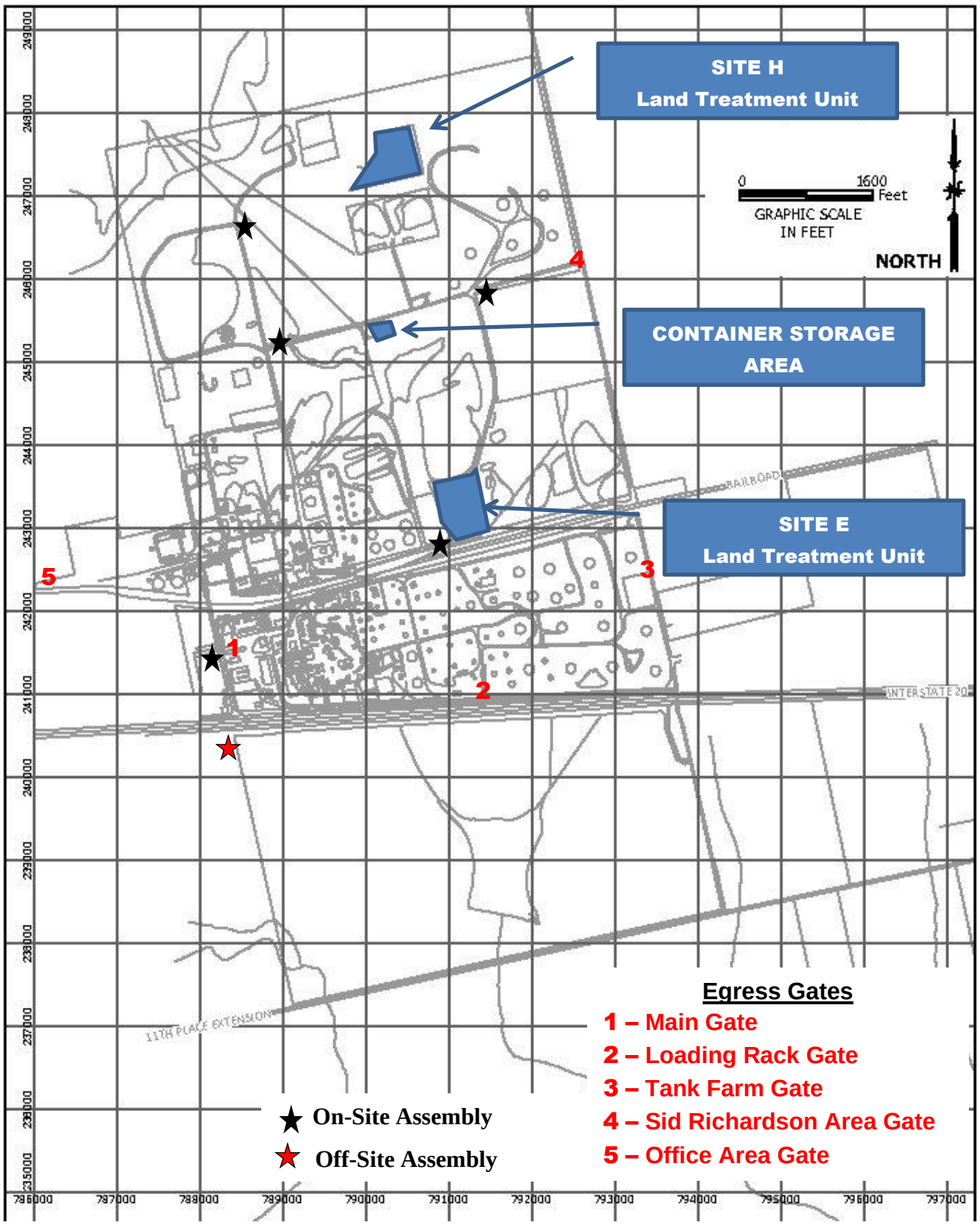
③ - Fire Hydrant

Figure III.E.1. (Sheet 18 of 18) [Insert 7-S] Emergency Equipment Location



③ - Fire Hydrant

Figure III.E-2 Primary Designated Assembly Locations for Evacuation



①

ATTACHMENT III.E-A

LETTERS DOCUMENTING NOTIFICATION OF LOCAL AUTHORITIES

April 28, 1988

Chief Carl Dorton
Big Spring Fire Department
P.O. Box 1390
Big Spring, Texas 79721-1390

Dear Chief Dorton:

Fina Oil and Chemical Company presently operates two (2) Hazardous Waste Management units, a container storage area and a land treatment unit, at the Big Spring Refinery and plans to begin the operation of two (2) additional Hazardous Waste Management units in 1988. These units will include another land treatment unit and a land treatment demonstration plot for field testing of waste application, with the construction of both units to commence within the next 90 days. The purpose of this letter is to notify you, as required by Federal and State regulations, of these hazardous waste activities and to request your assistance, if needed, in the unlikely event of an emergency associated with these operations.

Attached is a copy of our contingency plan which contains detailed procedures that will be followed if an emergency results from these hazardous waste management activities.

Please let me know if you have any questions.

Very truly yours,

Jimmie R. Wood
Safety Supervisor

JRW/jls

April 28, 1988

Chief Joe Cook
Big Spring Police Department
P.O. Box 3190
Big Spring, Texas 79721-3190

Dear Chief Cook:

Fina Oil and Chemical Company presently operates two (2) Hazardous Waste Management units, a container storage area and a land treatment unit, at the Big Spring Refinery and plans to begin the operation of two (2) additional Hazardous Waste Management units in 1988. These units will include another land treatment unit and a land treatment demonstration plot for field testing of waste application, with the construction of both units to commence within the next 90 days. The purpose of this letter is to notify you, as required by Federal and State regulations, of these hazardous waste activities and to request your assistance, if needed, in the unlikely event of an emergency associated with these operations.

Attached is a copy of our contingency plan which contains detailed procedures that will be followed if an emergency results from these hazardous waste management activities.

Please let me know if you have any questions.

Very truly yours,

Jimmie R. Wood
Safety Supervisor

JRW/jls

April 28, 1988

Sgt. Frank Woodall
Texas Department of Public Safety
P.O. Box 2259
Big Spring, Texas 79721-2259

Dear Sgt. Woodall:

Fina Oil and Chemical Company presently operates two (2) Hazardous Waste Management units, a container storage area and a land treatment unit, at the Big Spring Refinery and plans to begin the operation of two (2) additional Hazardous Waste Management units in 1988. These units will include another land treatment unit and a land treatment demonstration plot for field testing of waste application, with the construction of both units to commence within the next 90 days. The purpose of this letter is to notify you, as required by Federal and State regulations, of these hazardous waste activities and to request your assistance, if needed, in the unlikely event of an emergency associated with these operations.

Attached is a copy of our contingency plan which contains detailed procedures that will be followed if an emergency results from these hazardous waste management activities.

Please let me know if you have any questions.

Very truly yours,

Jimmie R. Wood
Safety Supervisor

JRW/jls

April 28, 1988

Sheriff A. N. Standard
Howard County Sheriff
P.O. Box 1208
Big Spring, Texas 79721-1208

Dear Sheriff Standard:

Fina Oil and Chemical Company presently operates two (2) Hazardous Waste Management units, a container storage area and a land treatment unit, at the Big Spring Refinery and plans to begin the operation of two (2) additional Hazardous Waste Management units in 1988. These units will include another land treatment unit and a land treatment demonstration plot for field testing of waste application, with the construction of both units to commence within the next 90 days. The purpose of this letter is to notify you, as required by Federal and State regulations, of these hazardous waste activities and to request your assistance, if needed, in the unlikely event of an emergency associated with these operations.

Attached is a copy of our contingency plan which contains detailed procedures that will be followed if an emergency results from these hazardous waste management activities.

Please let me know if you have any questions.

Very truly yours,

Jimmie R. Wood
Safety Supervisor

JRW/jls

April 28, 1988

Mr. Jim Roberson, Business Agent
Scenic Mountain Medical Center
1601 W. 11th Place
Big Spring, Texas 79720

Dear Mr. Roberson:

Fina Oil and Chemical Company presently operates two (2) Hazardous Waste Management units, a container storage area and a land treatment unit, at the Big Spring Refinery and plans to begin the operation of two (2) additional Hazardous Waste Management units in 1988. These units will include another land treatment unit and a land treatment demonstration plot for field testing of waste application, with the construction of both units to commence within the next 90 days. The purpose of this letter is to notify you, as required by Federal and State regulations, of these hazardous waste activities and to request your assistance, if needed, in the unlikely event of an emergency associated with these operations.

Attached is a copy of our contingency plan which contains detailed procedures that will be followed if an emergency results from these hazardous waste management activities.

Please let me know if you have any questions.

Very truly yours,

Jimmie R. Wood
Safety Supervisor

JRW/jls

Table III.E.1- Arrangements with Local Authorities

	Police
Address	Big Spring Police Department 3613 West Highway 80, Big Spring Texas 79720
Person Contacted	Chief Chad Williams
Phone Number	432/264-2560
Agreed Arrangements	Emergency Responders have been familiarized with the layout of the facility, the properties of hazardous waste handled at the facility and associated hazards, the places where facility personnel are normally working, the entrances to and roads within the facility, and evacuation plans/routes.

	Fire
Address	Big Spring Fire Department 1401 Apron Drive, Big Spring, Texas 79720
Person Contacted	Fire Marshall Dan Hendrickson
Phone Number	432/264-2302
Agreed Arrangements	Emergency Responders have been familiarized with the layout of the facility, the properties of hazardous waste handled at the facility and associated hazards, the places where facility personnel are normally working, the entrances to and roads within the facility, and evacuation plans/routes.

	Hospital
Address	Scenic Mountain Medical Center 1601 West 11th Place, Big Spring, Texas 79720
Person Contacted	Person on duty
Phone Number	432/263-1211
Agreed Arrangements	Emergency Responders have been familiarized with the layout of the facility, the properties of hazardous waste handled at the facility and associated hazards, the places where facility personnel are normally working, the entrances to and roads within the facility, and evacuation plans/routes.

Other

Organization Name	Howard County Sheriff Department
Address	300 Main Street, Big Spring, Texas 79720
Person Contacted	Sheriff Marcus Harris
Phone Number	432/264-2231
Agreed Arrangements	Emergency Responders have been familiarized with the layout of the facility, the properties of hazardous waste handled at the facility and associated hazards, the places where facility personnel are normally working, the entrances to and roads within the facility, and evacuation plans/routes.

Other

Organization Name	Howard County Volunteer Fire Department
Address	200 North Midway Road, Big Spring, Texas 79720
Person Contacted	Fire Chief Mitchell Hooper
Phone Number	432/268-1165
Agreed Arrangements	Emergency Responders have been familiarized with the layout of the facility, the properties of hazardous waste handled at the facility and associated hazards, the places where facility personnel are normally working, the entrances to and roads within the facility, and evacuation plans/routes.

Table III.E.2 - Emergency Coordinators

Name	Home Address	Office Phone(s) and/or Pager	Home Phone(s)
Primary	Jeff Rose	432-263-9505 Office	907-750-4152 cell
Primary	John Zalewsky	432-263-9505 Office	313-269-6968 cell

Name	Home Address	Office Phone(s) and/or Pager	Home Phone(s)
Alternate	Sylis Kariah	432-263-9505 Office	340-277-0897 cell
Alternate	Rich Stemmer	432-263-9505 Office	707-673-3686 cell

Table III.E.3- Emergency Equipment

Equipment	Location	Physical Description	Capability
1 - Foam Pumper	West Firehouse - East Door	Truck Unit - Containing Fires/ Spills	1000 gpm
1 - Liquid Pumper	West Firehouse - West Dooor	Truck Unit - Containing Fires/ Spills	500 gpm
2 - Foam Monitors	West Firehouse - West Floor	Protable - Regulating and Controlling Flow Rates	1000 gpm
2 - Foam Monitors	West Firehouse - West Floor	Portable - Regulating and Controlling Flow Rates	700 gpm
1 - Foam Monitor	West Firehouse - Southwest Floor	Portable - Regulating and Controlling Flow Rates	2000 gmp
2 - Monitors	West Firehouse - Back of 500 Pumper	Protable - Regulating Flow Rates	500 gpm
3 - Foam Dollies	West Firehouse - East Floor	4 wheel - Moving Foam Equipment	na
1 - Hale Transfer Pump	West Firehouse - Back of 500 Pumper	Portable - Water Distribution to Pumpers	1000 gpm
1 - Hale Transfer Pump	West Firehouse - East Floor	Portable - Water Distribution to Pumpers	1500 gpm
2 Cairns SCBA	West Firehouse - Foam Pumper	Full-Face Breathing Protection	1 hour
1 - Electric Pump	West Firehouse - Trailer	Portable - Auto/Manual Fluid Movement	2500 gpm
1 - Diesel Pump	West Firehouse - Trailer	Portable - Manual Fluid Movement	2500 gpm
1 - Electric Pump	West Firehouse - Trailer	Portable - Auto/Manual Fluid Movement	750 gpm

Equipment	Location	Physical Description	Capability
1 - Electric Pump	West Firehouse - Trailer	Portable Pressure Control	30 gpm
1 - Chlorine Repair Kit	West Firehouse - Southeast Cabinet	Maintenance	na
1 - Monitor	West Firehouse - back of 500 Pumper	Truck Mounted Flow Control	1250 gpm
1 - Equipment Trailer	East Firehouse - West Door	Equipment Movement	na
2 - 500 GPM Monitors	East Firehouse - Back of Equipment Trailer	Portable Flow Control	500 gpm
10 - Cairns SCBA	East Firehouse - Equipment Trailer	Full-Face Breathing Protection	1 hour
16 - Cairns SCBA	East Firehouse - Equipment Trailer	Full-Face Breathing Protection	1 hour
1 - Hazmat Trailer	East Firehouse - East Door	Equipment Movement	na
4 - Cairns SCBA	East Firehouse - Hazmat Trailer	Full-Face Breathing Protection	1 hour
10 - Class B Suits	East Firehouse - Hazmat Trailer	Full-Body Contact Protection	na
2 - Class A Suits	East Firehouse - Hazmat Trailer	Full-Body Contact Protection	na
3 - Water Hoses	East Firehouse - Hazmat Trailer	3-inch Fire-Line Fluid Movements and Directing	50-feet
3 - Stand Lights	East Firehouse - Hazmat Trailer	Adjustable Kleg-Lightes Night Work Illumination	110 Volt
1 - Rescue Tripod	East Firehouse - Hazmat Trailer	Stable Pully Stand - Below grade access, extraction	na

Equipment	Location	Physical Description	Capability
1 - Decon Shower	East Firehouse - Hazmat Trailer	Free-Standing	na
2 - Container Pigs	East Firehouse - Hazmat Trailer	Hard Plastic	na
1 - Tool Kit	East Firehouse - Hazmat Trailer	General Repairs - Metal Chest	na
2 - Extension Cords	East Firehouse - Hazmat Trailer	Power Distribution - Orange Cords	100-feet, 110V
2 - Decon Brushes	East Firehouse - Hazmat Trailer	Decontamination brush	na
2 - Decon Buckets	East Firehouse - Hazmat Trailer	Decontamination buckets	na
1 - AM/FM Radio	East Firehouse - Hazmat Trailer	Confirming accurate information flow	na
1 - Cassette Recorder	East Firehouse - Hazmat Trailer	On-Site Documentation	na
2 - Round-Point Shovels	East Firehouse - Hazmat Trailer	Round Point for Excavating	na
2 - Square Point Shovels	East Firehouse - Hazmat Trailer	Flat-Face for Cleanup	na
1 - Burn Pack	East Firehouse - Hazmat Trailer	Burn Treatment	na
1 - O2 Bottle	East Firehouse - Hazmat Trailer	Inhalation Issues	na
2 - Class A Suits	East Firehouse - Hazmat Trailer	Full-Body Contact Prevention	na
1 - Over Pack Set	East Firehouse - Hazmat Trailer	Plastic Over-drum for drum containment	55-gallon drum

Equipment	Location	Physical Description	Capability
4 - Full Face OVAG	East Firehouse - Hazmat Trailer	Full-Face - Breathing Protection	1 hour
2 - Dry Chemical Fire Extinquisher	East Firehouse - Hazmat Trailer	Fire Extinquisher	20 lbs capacity
4 - Pair Rubber Boots	East Firehouse - Hazmat Trailer	Over-boots for contact protection	na
6 - Warning Cones	East Firehouse - Hazmat Trailer	Orange Cones for traffic control	na
28 - Hoses	East Firehouse - West Rack	Reinforced Canvas and steel firehose	2 inch x 50-feet
47 - Hoses	East Firehouse - West Rack	Reinforced Canvas and steel firehose	3-inch x 50-feet
19 - Hoses	East Firehouse - West Rack	Reinforced Canvas and steel firehose	5-inch x 50-feet
15 - 2 inch x 50 ft Hoses	East Firehouse - Equipment Trailer	Reinforced Canvas and steel firehose	2 inch x 50-feet
6 - 3 inch x 50 ft Hoses	East Firehouse - Equipment Trailer	Reinforced Canvas and steel firehose	3-inch x 50-feet
46 - 5 Gallon Buckets AFFF	East Firehouse - South Wall	Aqueous Film-Forming Foam	5-gallons
18 - 5 Gallon Foam Stabilizers	East Firehouse - South Wall	Plastic 5-gallon pails	5-gallons
2 - Scott SKA Packs	Emergency Response Truck - Front Passenger	Full-Face - Breathing Protection	1-hour
3 - Scott 2.2 SCBAs	Emergency Response Truck - Back Passenger	Full-Face - Breathing Protection	1-hour
1 - Drum / Tank Repair Kit	Emergency Response Truck - Middle Passneger	In Poly-bag	1-drum

Equipment	Location	Physical Description	Capability
1 - First Aid Kit	Emergency Response Truck - Middle Passanger	White Bag with Red Cross	na
1 - Foam Educator	Emergency Response Truck - Middle Passanger	By-pass cycle tube for mixing foam	1.5-inch
1 - Stortz Adaptor	Emergency Response Truck - Middle Passanger	Brass double valve for connecting fire hoses together	5-inch
3 - Cairns SCBAs	Emergency Response Truck - Rear Compartment	Full-Face - Breathing Protection	1-hour
1 - Nozzle	Emergency Response Truck - Rear Compartment	Brass Nozzle for directing direction and spread of fluids	1250 gpm
2 - Medium Size Proximity Suits	Emergency Response Truck - Back Driver	Full-body protection from heat and chemicals	na
1 - Hazmat Pig Kit	Emergency Response Truck - Middle Driver	Absorbent Cloth tube for controlling spills	10-feet
1 - Manual Compressor	Emergency Response Truck - Middle Driver	Portable Unit	100 psi
1 - Porta Power with Jaws	Emergency Response Truck - Middle Driver	Mechanical Ripper Jaws for rescues	30-ton
1 - Generator	Emergency Response Truck - Front Driver	Portable generator	3000 Watt
1 - Hale Pump	Emergency Response Truck - Center Compartment	In-line fire-hose pump booster	50-gpm
1 - Aqueous Film-Forming Foam	Emergency Response Truck - Center Compartment	Aqueous Film-Forming Foam	25-gallon pail
4 - Hoses	Emergency Response Truck - Top Front	Reinforced Canvas and steel firehose	2-inch x 50-feet
3 - Hoses	Emergency Response Truck - Top Passenger	Reinforced Canvas and steel firehose	3-inch x 50-feet

Equipment	Location	Physical Description	Capability
2 - Nozzles	Emergency Response Truck - Top Front	Brass Fire Hose Nozzles	125 gpm
18 - 5 inch X 50 ft Hoses	Large Hose Trailer - Center Isle	Reinforced Canvas and steel firehose	5-inch x 50-feet
4 - 5 inch x 25 ft Hoses	Large Hose Trailer - Center Isle	Reinforced Canvas and steel firehose	5-inch x 25-feet
10 - 5 inch x 50 ft Hoses	Small Hose Trailer - Center Isle	Reinforced Canvas and steel firehose	5-inch x 50-feet
2 - 500 gallon Tanks AFFF	Foam Trailer - Center Isle	Metal Tank of Aqueous Film-Forming Foam	500-gallons
1 - 500 gallon Tank	Foam Trailer - Center Isle	Metal Tank	500-gallon
200 gallons AFFF Foam	Foam Monitoring Trailer FCCU	Aqueous Film-Forming Foam	200-gallons
6 - 2.5 inch x 50 ft Hoses	Foam Monitoring Trailer FCCU	Reinforced Canvas and steel firehose	2.5-inch x 50-feet
6 - 1.75 inch x 50 ft Hoses	Foam Monitoring Trailer FCCU	Reinforced Canvas and steel firehose	1.75-inch by 50-feet
1 - 500 GPM Foam Nozzle	Foam Monitoring Trailer FCCU	Brass Nozzle with firehose connector	500 gpm
1 - 2000 GPM Portable Pump	Northside Firehouse - North Wall	Portable Pump	2000 gpm
220 - 50 gallon Barrels AFFF Foam	Lube Oil Warehouse - Northwest Storage Area	Metal drums of Aqueous Film-Forming Foam	50-gallon
4 - 305 gallon Totes	Lube Oil Warehouse - Southwest Storage Area	Plastic tote containers	305-gallons

Section III – Facility Management Supplemental Information

A. Compliance History and Application Experience
   1. Provide listings of all solid waste management sites in Texas owned, operated, or controlled by the applicant as required by 30 TAC 305.50(a)(2).

      Alon USA GP – Big Spring Refinery – Big Spring, TX – SWR# 30083 – ACTIVE
      Alon USA GP – Hawley Terminal – Hawley, TX – SWR# 33770 – INACTIVE / CLOSED

B. Personnel Training Plan - **See Appendix III.B. – *Training Plan***
C. Security – **See Appendix III,C. – *Security Plan***
D. Inspection Schedule – **See Appendix III.D. – *Inspection Plan***
   - Table III.D – *Inspection Schedule*

E. Contingency Plan – **See Appendix III.E. – *Contingency Plan***
   - Table III.E.1. – *Arrangements with Local Authorities*
   - Table III.E.2. – *Emergency Coordinators*
   - Table III.E.3. – *Emergency Equipment List*

F. Emergency Response Plan (RESERVED)

Alon USA, LP
Alon USA Big Spring Refinery
Big Spring, TX

Hazardous Waste Permit 50140
Part B Application
SWR No. 30083 / RN100250869 /
CN600881783

SECTION IV
WASTES AND WASTE ANALYSIS

IV. Wastes and Waste Analysis

Provide all Part B responsive information in Appendix IV. When preparing the physical format organize your submittal using the Format of Hazardous Waste permit Application and Instructions.

A. Waste Management Information

For a new hazardous waste management facility or for a facility hazardous waste management capacity expansion, complete Table IV.A. - Waste Management Information for each waste, source, and volume of waste to be stored, processed, or disposed of in the facility units to be permitted as required by 30 TAC 305.50(a)(9). For on-site facilities, list "on-site" for the waste source. For off-site facilities, list the source of the waste. If unknown, identify potential sources (e.g., industries/processes to be serviced).

B. Waste Managed In Permitted Units

For all hazardous waste management facilities and for inclusion into a permit, complete Table IV.B. - Wastes Managed In Permitted Units for each waste and debris to be managed in a permitted unit. Provide a description, EPA waste codes, and TCEQ waste form codes and classification codes. Guidelines for the Classification & Coding of Industrial Wastes and Hazardous Wastes, TCEQ publication RG-22, contains guidance for how to properly classify and code industrial waste and hazardous waste in accordance with 30 TAC 335.501-335.515 (Subchapter R).

Applicants need not specify the complete 8-digit waste code formulas for their wastes but must include the 3-digit form codes and 1-digit classification codes. This allows the applicant to specify major categories of wastes in an overall manner without having to list all the specific waste streams as generated.

C. Sampling and Analytical Methods

For inclusion into a permit, complete Table IV.C. - Sampling and Analytical Methods for each waste and debris proposed to be sampled and analyzed and include sampling location, sampling method, sample frequency, analytical method, and desired accuracy level for each waste and debris to be managed in a permitted, storage, processing, or disposal unit at the facility.

D. Waste Analysis Plan

The Waste Analysis Plan must address the requirements of 40 CFR §264.13 and §268.7. The Plan should include supplemental and coordinating information on how the facility will analyze wastes and debris (as listed in Table IV.B) to be managed in permitted units. The plan must address the determination of land disposal restrictions. Generators must determine and certify with the manifest the land disposal restriction status of a waste, even if the waste or debris is not intended for land disposal. Land disposal treatment facilities must identify the treatment process and analytical procedures to be used, and include them in the waste analysis plan. Land disposal restriction records must be maintained at the facility until closure of the facility [40 CFR §264.73(b)]. Landfill facilities must determine through the Paint Filter Liquids Test (SW-846 Method 9095) if there is free liquid in a bulk or containerized waste to be landfilled. If so, it must be stabilized; adding adsorbents alone is not acceptable, even for containerized waste.

For off-site facilities the waste analysis plan must specify procedures which will be used to inspect and, if necessary, analyze each movement of industrial and hazardous waste or hazardous debris received at the facility to ensure it matches the identity of

the waste designated on the accompanying shipping ticket. The plan must describe methods which will be used to determine the identity of each movement of waste and debris managed at the facility and sampling method used if the identification method includes sampling in order to store, process, or dispose of the wastes and debris in accordance with 40 CFR Parts 264 and 268 and any abnormal characteristics which may upset further treatment or processing operations. Include rejection criteria for shipments of waste and debris received at the facility

For on-site facilities the waste analysis plan must specify the normal characteristics of the waste (including EPA hazardous waste codes, EPA hazard codes, and 40 CFR Part 261, Appendix VIII Hazardous Constituents) which must be known to store, process, or dispose of the wastes and debris in accordance with 40 CFR Parts 264 and 268 and any abnormal characteristics which may upset further treatment or processing operations.

The methods and equipment used for sampling waste materials will vary with the form and consistency of the waste materials to be sampled. Those sampling methods listed in 40 CFR Part 261 Appendix I, for sampling waste with properties similar to the indicated materials, or equivalent sampling methods approved by EPA under 40 CFR §260.20 and §260.21, will be considered by the TCEQ to be acceptable.

Alon USA, LP
Alon USA Big Spring Refinery
Big Spring, TX

Hazardous Waste Permit 50140 - Part B
Application SWR No. 30083 / RN100250869 / CN600881783

APPENDIX IV
APPLICATION RESPONSES
Wastes and Waste Analysis

Alon USA, LP
Alon USA Big Spring Refinery
Big Spring, TX

Hazardous Waste Permit 50140 - Part B
Application SWR No. 30083 / RN100250869 / CN600881783

SECTION IV
TABLES

Table IV.B. - Wastes Managed In Permitted Units

No.	Waste	EPA Hazardous Waste Numbers	TCEQ Waste Form Codes and Classification Codes
1	Heat Exchanger Bundle Cleaning Sludge	K050	695 / H 0010695H
2	Filter Media from Aromex Unit	D018	489 / H 0018489H
3	Crude/Vaccuum Tower Waste from Maintenance	D018	489 / H 0072489H
4	Primary oil/water/solids separation sludge (dewatered)	F037	319 / H 0075319H
5	Gasoline Filters, material containing benzene	D001, D018	310 / H 0110310H
6	Tank Bottom Sludge from Tank Cleanouts	D018	695 / H 0123695H
7	Spent Hydrotreating Catalyst	K171	393 / H 0138393H
8	API Seperator Sludge	K051	319 / H 0139319H
9	Non-Acute Hazardous Chemical Lab Waste	D001, D002, D003, D006, D007, D008, D009, D011, F003, F005	003 / H 0144003H
10	DGA filter, material containing benzene	D018	489 / H 0200489H
11	SCOTT Quench Filters	D018	489 / H 0300489H
12	Dry/Slurry metal hydroxide such as KOH that is off-spec or from an onsite process or service activity	D002	305 / H 0568305H
13	Tetraethylene Glycol solvent containing benzene and toluene	D001, D018	489 / H 0116489H
14	Petroleum contaminated soils exhibiting the characteristics of ignitability	D001	489 / H 0155489H
15	Chromium contaminated metal scale, filings, scrap, or blast material	D007	307 / H 0171307H
16	Crude Oil Tank sediment	K169	489 / H 0023489H
17	Ignitable spill cleanup waste. Petroleum contaminated soil exhibiting the characteristic of ignitability.; One time shipment NO LONGER GENERATED	D001	489 / H 0031489H

No.	Waste	EPA Hazardous Waste Numbers	TCEQ Waste Form Codes and Classification Codes
18	Spill cleanup-aromatic material; One time shipment NO LONGER GENERATED	D018	301 / H 0074301H
19	Asbestos from demolition, reconstruction activities	Non-Hazardous	311 / 1 00213111
20	Catalyst, reformer. Non-hazardous (Class 1) catalyst from reforming (naphtha) process	Non-Hazardous	393 / 1 00343931
21	Diglycolamine (DGA) off-specification material. Material that became outdated for use	Non-Hazardous	119 / 1 01021191
22	Petroleum coke from cleanout of vessels	Non-Hazardous	404 / 1 00024041
23	Rock, sand, and gravel, replaces waste #003	Non-Hazardous	389 / 1 00033891
24	Clay from Aromex or spent media for the treating of middle distillates.	Non-Hazardous	319 / 1 00043191
25	Oily sludge. Non-hazardous, non-listed sludge from diluted heavy oils to middle & light distillates generated during routine turnaround clean-up activities including waste from tanks,	Non-Hazardous	603 / 1 00056031
	Non-hazardous tank bottoms, petroluem products. Rust, scale and		307 / 1

No.	Waste	EPA Hazardous Waste Numbers	TCEQ Waste Form Codes and Classification Codes
26	solids generatedduring the cleanout of product tanks; contaminated with petroleum products	Non-Hazardous	00243071
27	Spill cleanup - nonhazardous. Cleanup of spills of hydrocarbon, crude oil, heavy oils, and other materials at nonhazardous levels	Non-Hazardous	489 / 1 00304891
28	Biological sludge from wastewater treatment - dewatered	Non-Hazardous	491 / 1 00674911
29	Non Hazardous soil generated from construction or demolition activities slightly contaminated with organics.	Non-Hazardous	301 / 1 01093011
30	Spent carbon from gas stream purification operations. Waste inactivated due to error in submission NO LONGER GENERATED	Non-Hazardous	404 / 1 00094041
31	Crude oil tank bottoms; non-hazardous dewatered; A new hazardous waste determination has been performed on this waste NO LONGER GENERATED	Non-Hazardous	319 / 1 00253191
32	Inorganic sludge-Cationic Asphalt Emulsifier (fatty amine)	Non-Hazardous	519 / 2 00295192

Table IV.C. - Sampling and Analytical Methods

Waste No.[1]	Sampling Location	Sampling Method[2]	Frequency	Parameter	Test Method[2]	Desired Accuracy Level[3]
1	CSA (drum)	Grab with dedicated extration tube	Annual	Arsenic Barium Cadmium Chromium Lead Mercury Nickel Selenium Silver Benzene Chlorobenzene Chloroform 1,2-Dichloroethane Methyl ethyl ketone	6010/7060 6010/7080 6010/7130 6010/7190 6010/7420 7470 6010/7520 6010/7740 6010/7760 8240/8260 8240/8260 8240/8260 8240/8260 8240/8260	5.0 mg/L 100.0 mg/L 1.0 mg/L 5.0 mg/L 5.0 mg/L 0.2 mg/L 5.0 mg/L 1.0 mg/L 5.0 mg/L 0.5 mg/L 100.0 mg/L 6.0 mg/L 0.5 mg/L 200.0 mg/L
2	CSA (drum)	Grab with dedicated extration tube	Annual	Ignitability Benzene	1010 8240/8260	<140oF 0.5 mg/L
3	CSA (drum)	Grab with dedicated extration tube	Annual	Benzene Chlorobenzene Chloroform 1,2-Dichloroethane Methyl ethyl ketone	8240/8260 8240/8260 8240/8260 8240/8260 8240/8260	0.5 mg/L 100.0 mg/L 6.0 mg/L 0.5 mg/L 200.0 mg/L
				Arsenic Barium Cadmium Chromium Lead Mercury Nickel	6010/7060 6010/7080 6010/7130 6010/7190 6010/7420 7470	5.0 mg/L 100.0 mg/L 1.0 mg/L 5.0 mg/L 5.0 mg/L 0.2 mg/L

4	CSA (drum)	Grab with dedicated extration tube	Annual	Selenium Silver Benzene Chlorobenzene Chloroform 1,2-Dichloroethane Methyl ethyl ketone Ignitability	6010/7520 6010/7740 6010/7760 8240/8260 8240/8260 8240/8260 8240/8260 1010	5.0 mg/L 1.0 mg/L 5.0 mg/L 0.5 mg/L 100.0 mg/L 6.0 mg/L 0.5 mg/L 200.0 mg/L <140oF
5	CSA (drum)	Grab with dedicated extration tube	Annual	Ignitability Benzene	1010 8240/8260	<140oF 0.5 mg/L
6	CSA (drum)	Grab with dedicated extration tube	Annual	Arsenic Barium Cadmium Chromium Lead Mercury Nickel Selenium Silver Benzene Chlorobenzene Chloroform 1,2-Dichloroethane Methyl ethyl ketone pH Ignitability TPH	6010/7060 6010/7080 6010/7130 6010/7190 6010/7420 7470 6010/7520 6010/7740 6010/7760 8240/8260 8240/8260 8240/8260 8240/8260 8240/8260 9045 1010 418.1	5.0 mg/L 100.0 mg/L 1.0 mg/L 5.0 mg/L 5.0 mg/L 0.2 mg/L 5.0 mg/L 1.0 mg/L 5.0 mg/L 0.5 mg/L 100.0 mg/L 6.0 mg/L 0.5 mg/L 200.0 mg/L >2 to <12.5 SU <140oF 1500 mg/L
7	CSA (drum)	Grab with dedicated extration tube	Annual	Benzene (TCLP)	8260 (1311)	0.5 mg/L

8	CSA (drum)	Historically applied to Site H, No longer Generated	not applicable	not applicable	not applicable	not applicable
9	CSA (drum)	Grab with dedicated extration tube	Annual	Ignitability Benzene	1010 8240/8260	<140oF 0.5 mg/L
10	CSA (drum)	Grab with dedicated extration tube	Annual	Benzene Ignitability	8240/8260 1010	0.5 mg/L <140oF
11	CSA (drum)	Grab with dedicated extration tube	Annual	Benzene Ignitability	8240/8260 1010	0.5 mg/L <140oF
12	CSA (drum)	Grab with dedicated extration tube	Annual	Arsenic Barium Cadmium Chromium Lead Mercury Nickel	6010 / 7060 6010 / 7080 6010 / 7130 6010 / 7190 6010 / 7420 7470 6010 / 7520	5.0 mg/L 100.0 mg/L 1.0 mg/L 5.0 mg/L 5.0 mg/L 0.2 mg/L 5.0 mg/L

[1] from Table IV.B, first column

[2] Sampling and Test/Analysis methods should be specified in enough detail to allow determination of whether they are suitable and correct for the purpose indicated while allowing flexibility in selection and future updates to the specified method. Standard methods, such as those from SW-846, will generally require no further submittal. Non-standard and proprietary methods may require additional information to determine suitability. ASTM methods may require submittal of a copy of the specified method.

3 Desired Accuracy Level should provide a specified numeric minimum performance level (maximum acceptable reporting limit) for method detection and quantitation limits that will be accepted from the laboratory performing the analysis and must ensure that reported data will allow determinations of compliance with regulatory limits for the parameter tested.

Alon USA, LP
Alon USA Big Spring Refinery
Big Spring, TX

Hazardous Waste Permit 50140 - Part B
Application SWR No. 30083 / RN100250869 / CN600881783

SECTION IV
APPENDIX IV.D.
WASTE ANALYSIS PLAN

Alon USA LP

WASTE ANALYSIS PLAN
Attachment IV.D.

Alon USA Big Spring Refinery
Big Spring, Texas, Howard County
HWP 20140 / ISW 30083
EPA ID TXD00813468

December 2023

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SECTION 1 INTRODUCTION

Alon USA, LP (Alon) operates a hazardous waste treatment, storage, and disposal (TSD) facility in Big Spring, Texas, in accordance with the requirements of the Resource Conservation and Recovery Act (RCRA). This Waste Analysis Plan (WAP) was developed according to the USEPA guidance manual entitled *Waste Analysis at Facilities that Generate, Treat, Store, and Dispose of Hazardous Waste,* OSWER 9938.4-03 and meets the requirements of 40 Code of Federal Regulations (CFR) §264.13 and the requirements of 30 Texas Administrative Code (TAC) §335.152.

1.1 Objectives of the Waste Analysis Plan

Proper waste characterization is essential to properly manage wastes generated at the Alon facility. This WAP provides information and procedures to ensure that the generated wastes are managed to minimize the risk to human health and the environment. The following information is provided within this plan:

- Procedures to identify or verify the chemical and physical characteristics of a waste by performing a detailed chemical and physical analysis of a representative sample of the waste or, in certain cases, by applying acceptable knowledge of the waste;
- Waste characterization procedures to ensure compliance with land-disposal restriction (LDR) treatment standards and prohibitions;
- Procedures to collect samples of each generated waste stream, including sample collection methods, frequency, sampling techniques, sample preservation, handling, and transportation;
- Descriptions of hazardous and nonhazardous waste streams currently generated;
- Procedures to ensure compliance with recordkeeping, notification, and report submission requirements;
- Waste determination procedures to ensure compliance with RCRA Organic Air Emission Standards of 40 CFR Parts 264 and 265, Subparts AA, BB, and CC.

Alon will follow this WAP to conform to regulatory requirements and to properly manage the wastes generated at the facility.

1.2 Organization of Waste Analysis Plan

The remainder of this WAP has been divided into the following sections:

- *Section 2 - Facility Description*: This section describes important facility-specific processes and activities.
- *Section 3 - Selection of Waste Analysis Parameters*: This section identifies the individual waste parameters for each waste that will be sampled and analyzed and provides the rationale for their selection.
- *Section 4 - Sampling Procedures*: This section identifies the appropriate sampling procedures for effective waste characterization.

- *Section 5 - Laboratory Testing and Analytical Methods*: This section identifies the appropriate laboratory testing and analytical methods.
- *Section 6 - Waste Evaluation Frequencies*: This section describes the frequency of analysis required to adequately characterize (and provide updated information on) the wastes generated at the Alon facility.
- *Section 7 - Special Procedural Requirements*: This section identifies the special procedures that will be followed when demonstrating compliance with the LDR treatment standards.
- *Section 8 - Implementation of Waste Analysis Plan*: This section discusses the procedures that will be followed during implementation of the WAP.

SECTION 2 FACILITY DESCRIPTION

This section describes important facility-specific processes and activities.

2.1 Description of Facility Processes and Activities

Alon generates hazardous and nonhazardous industrial solid wastes as a result of refinery processes, wastewater treatment, and crude oil and petroleum product storage and distribution. Alon is not authorized to receive waste from off-site and the types of wastes generated are sent off-site for disposal/treatment.

2.2 Identification/Classification of Wastes Generated

Alon is required to classify their own wastes according to the standards identified in the TCEQ Waste Classification Rules (30 TAC Chapter 335, Subchapter R) and the USEPA Identification and Listing of Hazardous Waste (40 CFR Part 261).

2.3 Hazardous Waste Determination

According to 40 CFR Part 261, a solid waste is considered hazardous if it is not excluded from regulation under 40 CFR §261.4(b) and it meets the following criteria:

- It is one of the following listed hazardous wastes under 40 CFR Part 261, Subpart D:
  - A waste generated from a nonspecific (F-listed) or specific (K-listed) source identified in 40 CFR §261.31 or §261.32, respectively; or
  - A discarded commercial chemical product, off-specification chemical specie, container residue, or spill residue (P-listed or U-listed wastes) identified in 40 CFR §261.33.
- It is a mixture of a solid waste and a listed hazardous waste, or it is a waste derived from the treatment of a listed hazardous waste.
- It exhibits any of the characteristics of a hazardous waste specified in 40 CFR Part 261, Subpart C (which includes the characteristics of ignitability, corrosivity, reactivity, and toxicity).

2.3.1 TCEQ Waste Classification

In the event the waste is not considered hazardous, the waste stream will be classified as an industrial nonhazardous waste according to the provisions in the TCEQ Waste Classification Rules. All industrial nonhazardous waste streams will be classified as follows:

- *Class 1 Waste:* A waste stream is considered Class 1 if: (1) it contains specific constituents at concentrations that equal or exceed the levels listed in Table 1 of Appendix 1 of the Waste Classification Rules; (2) it is considered ignitable/corrosive pursuant to 30 TAC §335.505; or (3) it contains a concentration of total petroleum hydrocarbons that exceeds 1,500 parts per million.

- *Class 2 Waste:* A waste stream is considered Class 2 if it is not classified as a Class 1 waste and if it does not qualify as a Class 3 waste pursuant to 30 TAC §335.507.

- *Class 3 Waste:* A waste stream is considered Class 3 if it (1) is inert and essentially insoluble and poses no threat to human health or the environment and (2) does not meet any of the Class 1 waste criteria set forth in 30 TAC §335.505.

Once a waste stream has been classified as either hazardous or nonhazardous, the TCEQ requires all generators to identify the types of wastes that they generate on their Notice of Registration (NOR) pursuant to 30 TAC §335.6. Each waste stream identified on the NOR shall be coded with an eight-digit waste code number that includes a four digit sequence number assigned by the generator, a three-digit form code, and a one character classification (either H, 1, 2, or 3). The "H" represents a waste stream that is classified as hazardous waste, while a number designation represents the industrial nonhazardous waste class.

2.3.2 Determination of Volatile Organics Concentrations

RCRA has established standards for the control of air emissions from hazardous wastes managed in certain RCRA regulated units. Affected units are containers, tanks and surface impoundments that are subject to hazardous waste permitting, interim status, or 90-day storage requirements. These RCRA air regulations are identified as Subparts AA, BB, and CC.

- Subpart AA applies to process vents on units managing hazardous waste >10 parts per million by weight (ppmw) organics;

- Subpart BB applies to equipment containing/contacting hazardous waste >10 percent organics; and

- Subpart CC applies to RCRA containers, tanks, and surface impoundments that manage hazardous wastes with volatile organic concentrations >500 ppm.

All currently generated waste streams at the Alon facility have been classified according to the aforementioned criteria. The types of waste that are generated on-site, their classification, and their sources of generation are presented in Table IV.D-1. The analytical data sheets from waste samples analyzed are maintained in Alon's operating records to support the classification of the wastes.

- For any newly generated waste stream or if process changes are made which could alter the classification of an existing waste at the facility, Alon will classify the waste according to the criteria discussed above. In the event of a newly classified waste stream, Alon will notify the TCEQ through an updated NOR. TCEQ Form 0002A (or the most current TCEQ form available for this purpose) will be used to provide notification for newly generated wastes or to change the classification of currently generated wastes. Copies of this form are maintained in the operating files at the facility.

-

2.4 Description of Waste Management Units

Alon does not have any Process Vents that are subject to the air emissions standards of Subpart AA. However, the refinery may have storage units and/or equipment subject to Subpart BB and Subpart CC. These storage units may manage hazardous wastes under the 90-day permit exemption pursuant to 40 CFR §262.17. At one-time, Alon had three permitted hazardous waste management units but currently, the only active permitted hazardous waste management unit is the Container Storage Area.

One of the permitted units was the Site E Land Treatment Unit that was utilized for application of hazardous waste from 1976 to 1988. Closure of the Site E Land Treatment Unit commenced in 1988 and closure certification was approved in 1996 and the unit has been in post-closure care since that time. The second closed unit is the Site H Land Treatment Unit. The Site H Land Treatment Unit began receiving hazardous waste in 1992, but the unit has not received waste since December 19, 1994. The closure certification was approved for the Site H Land Treatment Unit in 2004. The only active permitted hazardous waste management unit is the Container Storage Area that is located north of the process areas of the Alon facility and well within the boundaries of the facility. This HWM unit is comprised of three individual storage areas constructed as 6-inch asphalt pads for the storage of drummed solid hazardous wastes (Areas A and B) and a 6-inch concrete pad (with curbs and a sump) for the storage of drummed liquid hazardous wastes. The Container Storage Area is currently active.

SECTION 3 SELECTION OF WASTE ANALYSIS PARAMETERS

This section identifies the individual waste parameters for each waste that will be sampled and analyzed and provides the rationale for their selection.

3.1 Criteria of Waste Analysis Parameters

Based on the types of processes at the facility and the different types of waste generated, Alon has identified four categories of waste analysis parameters. These categories were developed based on a hierarchy of waste classification by identifying (1) hazardous waste streams, (2) nonhazardous waste streams, and (3) those parameters relevant to the facility's process and design considerations. The following is a list of the four waste analysis parameter categories and the rationale regarding their use in the classification of the types of wastes that are generated:

- Tier 1 (Hazardous Waste Determination Parameters): These parameters will be utilized to determine those waste streams that are characteristically hazardous in accordance with the RCRA characteristics and listings set forth in 40 CFR Part 261, Subparts C and D. A list of the Tier 1 parameters is provided in Table IV.D-2. The identification of listed hazardous wastes will be based on process knowledge of the specific source.

- Tier 2 (Chemical/Physical Characterization Parameters): The USEPA has designated these chemical parameters as the "Modified Skinner List", which are parameters typically present in the wastes generated as a result of petroleum refining processes. These parameters will be utilized to document constituent concentrations present within each waste stream in order to ensure (1) that safe and effective waste management operations are being maintained and (2) compliance with applicable LDRs presented in 40 CFR §268.Subpart D. The physical characterization parameters will be utilized to assist with the proper on-site management of the waste or provide additional information for profiling wastes that will be sent off-site for disposal. A list of the Tier 2 parameters is provided in Table IV.D-3.

- Tier 3 (Waste Classification Parameters): These parameters will be utilized to classify those waste streams that had been determined to be nonhazardous (based on the results of the Tier 1 analysis). A list of the Tier 3 parameters is provided in Table IV.D-4. In accordance with the TCEQ Waste Classification Rules, each nonhazardous waste stream will be classified as a Class 1 waste if either (1) the constituent concentrations equal or exceed the levels identified in Table IV.D-4 or (2) if the nonhazardous waste is assumed to be a Class 1 nonhazardous waste. If the reported concentrations are less than those identified in Table IV.D-4 the waste stream will be classified as either a Class 2 or a Class 3 industrial nonhazardous waste (see Section 2.2).

- Tier 4 (Organic Air Emission Parameters); These parameters will be utilized to ensure compliance with the RCRA Organic Air Emission Standards of 40 CFR Part 265, Subparts BB and CC. Routine procedures for determination of volatile organic compound (VOC) concentrations in a hazardous waste at the point of origination are identified in Table IV.D-5. Should Alon feel that any specific determination of VOC concentration in the hazardous waste over estimated organics likely to volatilize, the procedures described in 40 CFR §§264.1081 and 265.1081 (under the definition of "volatile organic

concentration") will be utilized. Pursuant to adjustments made to analytical methods in rule (Federal Register date 11/25/96), Alon will discount any contribution to the total volatile organic concentration that is the result of including a compound with a Henry's law constant of less than 10 percent of the ratio of mole- fraction in the gas phase/ mole-fraction in the liquid-phase. Thus, if the waste contains compounds with Henry's law constants below the cutoff level, the VOC concentration for the waste will be adjusted to exclude the VOC concentration of these compounds from the total VOC concentration for the waste stream. A list of the Tier 4 parameters provided in Table IV.D-5 will be utilized to determine if equipment and/ or units are subject to the RCRA air emission standards for control of volatile organics.

All wastes that are generated at the Alon facility have been properly characterized using the hazardous waste determination procedures identified in 40 CFR Part 261, Subparts C and D. In the event that the waste was not considered hazardous, the waste stream was classified as an industrial nonhazardous waste according to the TCEQs Waste Classification Rules (30 TAC Chapter 335, Subpart R). Waste streams that are determined to be hazardous and being managed in units subject to 40 CFR Part 264, Subpart CC or Part 265, Subpart CC standards, will also be analyzed for the Tier 4 parameters. After the waste stream has been initially analyzed, the frequency of re-evaluating the waste stream constituents will depend on whether the process or the operation generating the waste has changed or when Alon has been notified by an off-site TSDF that the characterization of the wastes received at the TSDF does not match a pre-approved waste analysis certification and/ or the accompanying waste manifest or shipping paper. The re-evaluation frequencies are discussed in Section 6.

3.2 Non-Compatible Wastes

Certain wastes can produce hazardous situations through heat generation, fires, explosions, or release of toxic substances when mixed. Waste characteristics and compatibility groups are described in TCEQ *Technical Guideline No.9.* Based on the evaluation of the Tier 1 through Tier 3 analytical results obtained for each waste stream, Alon will be able to segregate incompatible wastes. A copy of *Technical Guideline No,* 9 is maintained for informational purposes in Alon's operating files.

SECTION 4 SAMPLING PROCEDURES

This section identifies the appropriate sampling procedures for effective waste characterization.

4.1 Sampling Strategies

Waste sampling will be conducted by utilizing methods appropriate for collecting representative samples of the particular waste. These methods are consistent with the form and physical properties of the waste, the test parameters, and the physical configuration of the tank or container from which the samples are being collected. All sampling will be conducted utilizing standard techniques as presented in *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* (USEPA SW-846, Volume II, Part III). All sampling materials and equipment will be thoroughly cleaned prior to collecting the waste samples.

In technical amendments to the Subpart CC rule published February 9, 1996, USEPA describes specific sampling procedures for the purpose of quantifying VOC concentration to determine applicability of Subpart CC controls. For the purpose of determining VOC concentration of a hazardous waste at the point of waste origination, the Subpart CC rules require that the waste generator collect a sufficient number of samples to represent the waste composition for a given test run. For a continuous process sampling, Alon will collect the samples within a 1-hour period of time. For batch process sampling *(i.e.,* filter press), samples will be collected from one or more representative batches generated by the process. In addition, a minimum of four samples will be collected from each batch.

In accordance with technical amendments to the rule published February 9, 1996, Alon will collect a minimum of four samples within the designated time period to make a single waste determination *(i.e.,* the VOC concentration of a discrete quantity of the material composing the hazardous waste). A minimum of four samples will be collected and individually analyzed. The results will then be mathematically averaged as a basis for the one waste determination for the discrete quantity of hazardous waste. Taking four samples and analyzing them individually accounts for normal variations in sampling and analysis technique and in the waste stream.

4.2 Sampling Location and Equipment

A representative sample will be collected from a location as close as possible to the point of generation of each waste stream. The sample collection locations and equipment to be utilized are presented in Table IV.D-6. Waste samples will be collected and placed into sample container(s), that are provided by the contract analytical laboratory. Sample containers will be shipped to the facility by the contract analytical laboratory complete with the appropriate preservatives required for the waste analysis. A listing and description of a typical set of waste sample collection containers (for the various waste media) is provided in Table IV.D-6. An appropriate amount of sample will be collected to ensure that each required analytical test can be performed.

4.3 Sampling Preservation and Storage

After the field samples are collected the laboratory analyses must be performed within a specific holding time in order for the analytical results to be considered valid. If holding times are exceeded, the values obtained from the analyses will be considered minimal concentrations. Analytical data obtained from samples that exceed the holding time are not acceptable in

establishing that a particular waste constituent does not exceed the regulatory level. However, exceeding the holding time does not invalidate characterization for a waste containing constituents that exceed regulatory levels. The maximum holding times allowed for waste analyses are also summarized in Table IV.D-7.

4.4 Quality Assurance/Quality Control Procedures

The objective of a quality assurance/quality control (QA/QC) program is to ensure that all waste characterization data are developed utilizing technically sound and well-documented procedures. The QA/QC program also ensures that field and laboratory quality control procedures are technically sound and properly documented. Detailed field and QA/QC assurance procedures are presented in Alon's Quality Assurance Plan. A copy of this plan is maintained at the Alon facility.

4.5 Health and Safety Protocols

Appropriate safety equipment will be utilized by all sampling personnel during all waste sampling events. Equipment available on-site includes gloves, goggles, face shields, safety glasses, half-face and full-face respirators, Tyvek suits (and other protective clothing), and rubber boots. Facility personnel will be trained in the proper use and maintenance of safety equipment and in hazardous waste management and handling prior to being assigned to any area where hazardous wastes are to be sampled.

SECTION 5 LABORATORY TESTING AND ANALYTICAL METHODS

This section identifies the appropriate laboratory testing and analytical methods.

5.1 Laboratory Qualifications

Alon will only use those laboratories that are certified by the TCEQ and will be capable of providing documentation of their proven analytical capabilities, available instrumentation, and standard operating procedures. Copies of their documentation will be maintained at the facility. At a minimum, the laboratories that Alon plans to utilize will exhibit experience and capabilities in the following three areas:

- Comprehensive QA/QC programs (both qualitative and quantitative);
- Technical analytical expertise; and
- Effective information management systems.

5.2 Testing and Analytical Methods

The testing and analytical methods that Alon has chosen to provide reliable data to ensure safe and effective waste management have been identified in Tables IV.D-2 through IV.D-5. These analytical methods are specific to the physical state of the waste sample *(e.g.,* solid or liquid), the parameters of interest *(e.g.,* volatile organics), and the minimum detection limits for comparison to regulatory thresholds.

SWRC will calculate GHG emissions on a monthly basis for the Flares in order to track emissions generation throughout the year and to evaluate missing data. These monthly quantities will be summed to determine the total GHG emissions quantity for the year.

SECTION 6 WASTE EVALUATION FREQUENCIES

This section describes the frequency of analysis required to adequately characterize (and) provide updated information on) the wastes generated at the Alon facility.

6.1 Waste Characterization

Whenever a newly generated waste is identified, representative waste samples will be collected and the appropriate analyses (see Figure IV.D-1) parameter will be conducted to make a waste classification determination. Additional samples will be collected and the appropriate analyses (see Figure IV.D-1) parameters will be repeated if one of the following conditions occurs:

- A process change results in an alteration of the physical and/or chemical properties of the waste;
- The physical properties of the waste are observed to be different from the expected properties; and
- An additional analysis is required by an off-site facility that provides waste treatment and/or disposal.

The waste classifications of "Plant Production Refuse" and "Plant Office Refuse" have been determined based the definitions provided in 30 TAC §335.508 (3)(B) and (C) and Alon's process knowledge on how the facility segregates its refuse. Based on the specific definitions provided in the TCEQ Waste Classification Rules, Alon does not conduct waste analyses on these plant refuse wastes.

6.2 One Time Generated Wastes

For a waste generated on a one-time basis, a representative sample will be collected each time the waste is generated. The specific procedures to be followed for those wastes that are targeted for off-site disposal are detailed below. The wastes in this category are typically generated as a result of a spill of product such as gasoline, BT naphtha, or reformate (or whenever units are taken out of service). For each occurrence, Alon will collect and manage the waste in accordance with the following procedures (unless process knowledge of the spilled material makes sampling unnecessary):

- Collect the waste in roll-off boxes and cover the boxes; and
- Submit a sample of the waste to the contract laboratory for analysis of the appropriate parameters.

A representative sample of each waste targeted for off-site disposal will be collected using the rationale depicted in Figure N.D-I. If the waste is a listed or characteristically hazardous waste, the waste will be manifested for off-site disposal to an authorized hazardous waste management facility. If the waste is determined not to be a hazardous waste, the waste will be manifested off-site to an authorized facility.

SECTION 7 SPECIAL PROCEDURAL REQUIREMENTS

This section identifies the special procedures that will be followed when demonstrating compliance with the LDR treatment standards.

7.1 Compliance with land-Disposal Restrictions

The LDRs for hazardous wastes detailed in 40 CFR Part 268 impact the analytical parameters and methods proposed in this WAP. Discussions of the treatment standards, wastes subject to the LDRs, and the notification and certification requirements for LDR wastes generated at the Alon facility are presented in this section.

7.1.1 Treatment Standards

The LDR treatment standards currently require that wastes be treated to meet certain concentration limits (universal treatment standards) for hazardous constituents contained in the wastes. In order to land dispose a hazardous waste, the concentrations of hazardous constituents in any treatment residue cannot exceed the universal treatment standards established in 40 CFR Part 268. Treatment standards for hazardous wastes that are generated at the Alon facility and subject to concentration-based standards are provided in 40 CFR Part 268.

7.1.2 Notification and Certification Requirements

The LDRs require that Alon provide notifications and certifications to off-site TSD facilities that explain those restrictions applicable to the wastes being shipped to the facilities. If the waste does not meet applicable treatment standards or prohibition levels and is being shipped to an off-site TSD facility, Alon only has to send a one-time notification to the TSD facility using a notification form similar to that included as Figure IV.D-2. Alon will also contact the receiving facility to determine if the facility requires a specific type of form. After the initial submittal of the LDR form, an updated form is required only if the characteristics of the waste changes or the receiving facility changes its requirements. To ensure compliance with the LDRs, Alon will maintain a copy of all completed LDR forms in its operating records.

Prohibited wastes treated on-site to meet the applicable LDR treatment standards are analyzed in accordance with the methods and procedures described in this WAP. If any treated wastes are shipped off-site, notification in accordance with the LDR requirements is provided.

7.2 Records

All hazardous waste manifests will be retained for at least 3 years from the date of shipment. Copies of all notices, certifications, and demonstrations for wastes that are subject to LDRs and sent off-site will be retained in the Alon operating records for at least 5 years from the date of shipment. If the waste is determined to be subject to LDRs based solely on process knowledge, all supporting data used to make the determination will be retained in the operating records. The 5-year record retention requirement is automatically extended during the period of any unresolved

enforcement action related to the regulated activity. Alon will maintain in its operating records the following waste management information:

- Results of all waste analyses (including quality control data) conducted in accordance with this WAP
- Records necessary to comply with LDRs
- A description and the quantity of each hazardous waste managed

The referenced information will be maintained in the operating records until closure of the Alon facility.

SECTION 8 IMPLEMENTATION OF WASTE ANALYSIS PLAN

The procedures presented below are to be followed by Alon during implementation of the WAP:

- Alon will keep a copy of the WAP on file and available for review by authorized USEPA or TCEQ representatives.
- Alon will maintain records of all waste analysis results as specified in 40 CFR §264.73(b)(3) in the operating records until closure of the facility.
- Alon will submit the results of all waste analyses to the TCEQ in an annual site activity report.
- Alon will provide written notification to the Executive Director of the TCEQ pursuant to 30 TAC §33S.6(b) in the event that (1) a new waste stream is generated at the facility or (2) changes in refining processes or operating procedures alter the waste characteristics or waste management methods.
- Alon will review the WAP and results of the required waste analyses annually in order to ensure that the objectives of the WAP are being met. The plan will be updated as necessary to meet the stated objectives or to conform to changes in applicable regulations. Revisions will be distributed to the appropriate regulatory agencies and Alon personnel who have been issued previous copies of the WAP.
- Alon will provide written notification to the USEPA Region VI Regional Administrator in accordance with 40 CFR §268.7(a)(4) should on-site treatment of wastes subject to LDRs be initiated.
- This WAP may be revised when:
  - Processes are changed, or other factors affecting waste identification have occurred;
  - Alon's hazardous waste permit (HW-S0140) is modified or re-issued;
  - Regulations affecting the definition of hazardous waste are promulgated, which may result in an increase in the number or types of hazardous wastes managed at the facility; or
  - Regulations are promulgated affecting management of existing wastes at the facility.

LIST OF FIGURES

- Figure IV.D-1 Waste Analysis Logic Diagram for Proper Waste Characterization
- Figure IV.D-2 Notice to the TSD Facility That Wastes Do Not Meet Land-Disposal Restrictions Treatment Standards

Figure VI.D-1

Waste Analysis Logic Diagram For Proper Waste Characterization

Alon USA Big Spring Refinery

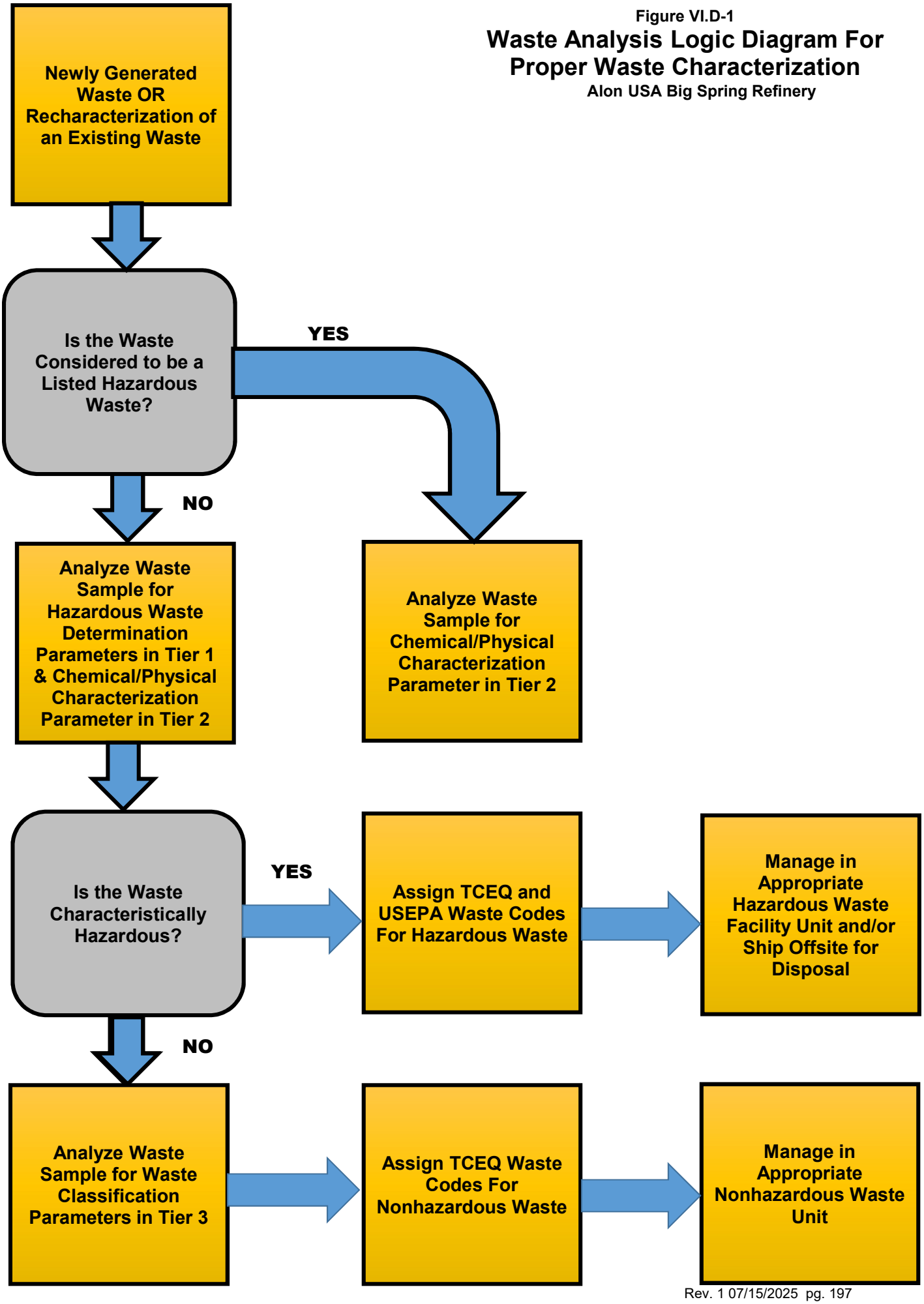

Figure IV.D-2

Notice to the TSD Facility That Wastes Do Not Meet Land-Disposal Restriction Treatment Standards

The wastes identified on manifest number _____ and bearing the USEPA Hazardous Waste Number(s)_____ are subject to the land-disposal restriction of 40 CFR part 268. The wastes do not comply with the treatment standards specified in Subpart D, or do not meet the prohibitions of Section 269.32, or RCRA Section 3004(d).
This Shipment includes the waste identified below:

HAZARDOUS WASTE NO.(1)	SUB-CATEFORY(2)	TREATABILITY GROUP(3)	CFR REFERENCE FOR TREATMENT STANDARDS(4)	FIVE-LETTER CODE(S)(5)

(1) Hazardous waste numbers can be determined from 40 CFR §261.21 - §261.33.
(2) Identify the appropriate subcategory (if any) from 40 CFR §268.41 - §268.43.
(3) Treatability group, either "wastewater" or "nonwastewater", can be determined from 40 CFR §268.2(d) and (f).
(4) To find the CRF reference for the treatment standard, lok up the waste in 40 CFR §268.4(a) - Table CCWE; §268.42(a)(1), (a)(2), (c), and Tables 2 and 3; and
(5) Whenever the CFR reference is §268.42, a five-letter code (e.g., INCIN) must be included.

A waste analysis for these wastes ☐ **Is** / ☐ **Is Not** attached.

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TABLE IV.D-1

Hazardous Wastes and Management Activities

Alon USA LP - Big Spring Refinery

Waste	TCEQ Waste Form Codes and Classification Codes	Source Code	EPA Hazardous Waste Numbers	WASTE MANAGEMENT ACTIVITIES				Annual Quantity Generated/ Received (TONS)	SIC Code & Process
				Off-Site Disposal	On-Site				
					Storage	Processing	Disposal		
Chromium-Contaminated Soil	0006302H	G32	D007	X	X			0.00	2911 Petroleum Refining
Spent Filters with benzene	0008310H	G16	D018	X	X			0.00	2911 Petroleum Refining
Heat Exchanger Bundle Cleaning Sludge	0010695H	G13	K050	X	X			65.71	2911 Petroleum Refining
Spent Caustic Solution in Water	0014110H	G08	D002		X		WWTP	0.00	2911 Petroleum Refining
Filter Media from Aromex Unit	0018489H	G07	D018		X			0.00	2911 Petroleum Refining
Computer Monitors, Keyboards, Circuit Boards, Circuit board casings & Containers that came in contact with battery	0019309H	G16	D007, D008, D009	X				0.00	2911 Petroleum Refining
Tank Bottom cleanout scale & solids	0023489H	G14	D001, K169	X	X			10.90	2911 Petroleum Refining
Slop oil emulsion sludge from separation of recoverable oil	0027603H	G09	K049		X		WWTP	0.00	2911 Petroleum Refining
Concentrated aqueous solution of off-spec Mercaptan & other organic liquids offspec or needing disposal	0043207H	G11	D001	X				0.00	2911 Petroleum Refining
Merox Unit Disulfide Seperator material	0060489H	G07	D018		X			0.00	2911 Petroleum Refining
Petroleum contaminated Solids	0074289H	G32	D018	X				26.02	2911 Petroleum Refining
Primary oil/water/solids separation sludge (dewatered)	0075319H	G25	F037		X		WWTP	197.17	2911 Petroleum Refining

TABLE IV.D-1

Hazardous Wastes and Management Activities

Alon USA LP - Big Spring Refinery

Waste	TCEQ Waste Form Codes and Classification Codes	Source Code	EPA Hazardous Waste Numbers	WASTE MANAGEMENT ACTIVITIES				Annual Quantity Generated/ Received (TONS)	SIC Code & Process
				Off-Site Disposal	On-Site				
					Storage	Processing	Disposal		
Spent carbon	0100404H	G49	D018	X	X			0.00	2911 Petroleum Refining
Gasoline Filters, material containing benzene	0110310H	G07	D001, D018	X	X			0.61	2911 Petroleum Refining
Crude oil tank bottoms	0113489H	G14	D018, K169	X	X			0.00	2911 Petroleum Refining
Clarified slurry oil tank sediment	0114489H	G14	K170		X			0.00	2911 Petroleum Refining
Tetraethylene Glycol solvent containing benzene and toluene	0116489H	G13	D001, D018		X			0.00	2911 Petroleum Refining
Tank Bottom Sludge from Tank Cleanouts	0123695H	G14	D018	X	X			112.45	2911 Petroleum Refining
Waste paint and paint related material (ignitable)	0129209H	G11	DOO1, D035, F005	X	X			0.00	2911 Petroleum Refining
Spent Catalyst Co/Ni/Mo on Alumina	0135393H	G08	D001, D003, D004	X	X			0.00	2911 Petroleum Refining
Spent Hydrotreating Catalyst	0138393H	G08	K171	X	X			191.66	2911 Petroleum Refining
Primary/Secondary oil/water/solid separator wastewater sludge	0140319H	G23	F037, F038	X				0.00	2911 Petroleum Refining
Non-Acute Hazardous Chemical Lab Waste	0144003H	G11	D001, D002, D003, D006, D007, D008, D009, D011, F003, F005	X	X			0.17	2911 Petroleum Refining
Petroleum contaminated soils exhibiting the characteristics of ignitability	0155489H	G13	D001		X			0.00	2911 Petroleum Refining

TABLE IV.D-1

Hazardous Wastes and Management Activities

Alon USA LP - Big Spring Refinery

Waste	TCEQ Waste Form Codes and Classification Codes	Source Code	EPA Hazardous Waste Numbers	WASTE MANAGEMENT ACTIVITIES				Annual Quantity Generated/ Received (TONS)	SIC Code & Process
				Off-Site Disposal	On-Site				
					Storage	Processing	Disposal		
Chromium contaminated metal scale, filings, scrap, or blast material	0171307H	G13	D007	X	X			0.00	2911 Petroleum Refining
DGA filter, material containing benzene	0200489H	G07	D018	X	X			7.04	2911 Petroleum Refining
SCOTT Quench Filters	0300489H	G07	D018	X	X			3.32	2911 Petroleum Refining
DHT filters with high concentration of H2S	0500801H	G13	U135	X	X			0.00	2911 Petroleum Refining
Waste resulting from neutralization activites in the Alky Unit	0501110H	G32	D002	X	X			0.00	2911 Petroleum Refining
Dry/Slurry metal hydroxide such as KOH that is off-spec or from an onsite process or service activity	0568305H	G11	D002		X			17.24	2911 Petroleum Refining

(1) "Storage" means the holding of solid waste for a temporary period, at the end of which the waste is processed, disposed of, or stored elsewhere.

(2) "Processing" means the extraction of materials, transfer, volume reduction, conversion to energy, or other separation and preparation of solid waste for reuse or disposal, including the treatment or neutralization of hazardous waste, designed to change the physical, chemical, or biological character or composition of any hazardous waste so as to neutralize such waste, or so as to recover energy or material from the waste or so as to render such waste nonhazardous or less hazardous; safer for transport, store or dispose of; or amenable for recovery, amenable for storage, or reduced in volume. The "transfer" of solid waste for reuse or disposal as used above, does not include the actions of a transporter in conveying or transporting solid waste by truck, ship, pipeline, or other means. Unless the Executive Director determines that regulation of such activity is necessary to protect human health or the environment, the definition of "processing" does not include activities relating to those materials exempted by the Resource Conservation and Recovery Act, 42 U.s.c. 6901 et seq., as amended .

(3) Represents quantity generated and/ or received during 2009

Table IV.D-2

Hazardous Waste Determination Parameters and Analytical Methods - Tier 1

Alon USA LP - Big Spring Refinery -

PARAMETER	HAZARDOUS WASTE REGULATORY LEVEL[1]	ANALYTICAL METHOD[2]
General Characteristics:		
• Paint filter test (free liquids)	presence of liquids	9095
• Ignitability (free liquids)	flash point < 140°F	1010 (free liquids only)
• Corrosivity	pH ≤ 2 or ≥ 12.5, corrodes steel >6.35 mm/yr	9045 (free liquids only) 1110
• Reactivity	reacts violently with water of generates toxic gas	9010 (cyanide) 9030 (sulfide)
Toxicity Characteristic leaching Procedure (Method 1311):		
Inorganics		
• Arsenic	5.0 mg/L	6010 / 7060
• Barium	100.0 mg/L	6010 / 7080
• Cadmium	1.0 mg/L	6010 / 7130
• Chromium	5.0 mg/L	6010 / 7190
• Lead	5.0 mg/L	6010 / 7420
• Mercury	0.2 mg/L	7470
• Nickel	5.0 mg/L [3]	6010 / 7520
• Selenium	1.0 mg/L	6010 / 7740
• Silver	5.0 mg/L	6010 / 7760
Volatile Organics		
• Benzene	0.5 mg/L	8240 / 8260
• Chlorobenzene	100.0 mg/L	8240 / 8260
• Chloroform	6.0 mg/L	8240 / 8260
• 1,2-Dichloroethane	0.5 mg/L	8240 / 8260
• Methyl ethyl ketone	200.0 mg/L	8240 / 8260
Semivolitile Organics		
• Cresols (total)	200.0 mg/L	8270
• 1,4-Dichlorobenzene	7.5 mg/L	8270
• Pyridine	5.0 mg/L	8270

(1) Tegulatory levels are identified in 40 Code of Federal Regulations (CFR) §261.21-24.

(2) Analytical methods are identified in Test methods for Evaluating Solid waste,*Physical/Chemical Methods* , USEPA SW-846

(3) Nickel is not a characteristic of hazardous waste. The reported concentration (5.0 mg/L) represents the LDR treatment standard for listed hazardous wastes (F037, F038, and K052)

Table IV.D-3

Characterization Parameters and Analytical Methods - Tier 2

Alon USA LP - Big Spring Refinery -

PARAMETER	ANALYTICAL METHOD[2][3]
Total Concentrations	
Inorganics:	
• Antimony	6020A
• Arsenic	6020A
• Barium	6020A
• Beryllium	6020A
• Cadmium	6020A
• Chromium (total)	6020A
• Cobalt	6020A
• Cyanides (total)	9010
• Lead	6020A
• Mercury	7470
• Nickel	6020A
• Selenium	6020A
• Silver	6020A
• Vanadium	6020A
Volatile Organcs:	
• Benzene	8260B
• Chlorobenzene	8260B
• Chloroform	8260B
• Carbon disulfide	8260B
• 1,2-Dichloroethane	8260B
• Ethylene dibromide	8260B
• 1,4-Dioxane	8260B
• Ethylbenzene	8260B
• Methyl ethyl ketone	8260B
• Methyl Tert Butyl Ether	8260B
• Styrene	8260B
• 1,1,1-Trichloroethane	8260B
• Tetrachloroethylene	8260B
• Toluene	8260B
• Trichloroethylene	8260B
• Xylenes, total	8260B
Physical:	
Oil and Grease	9070
Moisture Content	160.3[3]
Solids Content	160.3[3]
Total Organic Carbon	9060

PARAMETER	ANALYTICAL METHOD[2][3]
Total Concentrations	
Semivolatile Organics:	
• Benzenethiol	8270
• 2,4-Dimethylphenoll	8270
• 2,4-Dinitrophenoll	8270
• 2-Methylphenoll	8270
• 3&4-Methylphenoll	8270
• 4-Nitrophenoll	8270
• Phenoll	8270
• Acenaphthenel	8270
• Anthracenel	8270
• Benzo(a)anthracenel	8270
• Benzo(a)pyrenel	8270
• Benzo(b)fluoranthenel	8270
• Benzo(k)fluoranthenel	8270
• Chrysenel	8270
• 1,2-Dichlorobenzenel	8270
• Bis(2-ethylhexyl) phthalate	8270
• Butyl benzyl phthalate	8270
• o-Cresol	8270
• m, p-Cresol	8270
• Dobemz(a,h)acrodine	8270
• Dibenz(a,h)anthracene	8270
• 1.3-Dichlorobenzene	8270
• 1,4-Dichlorobenzene	8270
• 7,12-Dimethylbenz(a)anthracene	8270
• Dimethyl phthalate	8270
• Di(n)butyl phthalate	8270
• Do(n)octyl phthalate	8270
• Fluoranthene	8270
• Fluorene	8270
• Indene	8270
• Methylchrysene	8270
• 1-Methylnaphthalene	8270
• Naphthalene	8270
• Phenanthrene	8270
• Pyrene	8270
• Pyridine	8270
• Quinoline	8270

(1) Unless otherwise noted, all values reported in parts per million (PPM). For solid/sludge wastes, the analytical results should be reported in milligrams per kilogram (mg/kg). The analytical results for liquid wastes should be reported in milligrams per liter (mg/L).

(2) Unless other wise noted, analytical methods are identified in *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* , USEPA SW-846

(3) Analytical method is identified in *Methods of Chemical Analysis of Water and Wastes* , USEPA 600/4-79-020.

Table IV.D-4

Waste Classification Parameters and Analytical Methods - Tier 3

Alon USA LP - Big Spring Refinery

PARAMETER	CLASS 1 REGULATORY LEVEL(1)	ANALYTICAL METHOD(2)
General Characteristics		
• Ignitability (liquids only)	flash point < 150o F	1010 (free liquids only)
• Corrosivity (solids only)	pH < 2 or > 12.5	9045 (liquid extract)
• Cyanides (totals)	> 20 mg/kg	9010
• Total Petroleum Hydrocarbons	1,500 mg/kg	418.1(3)
Toxicity Characteristics Leaching Procedure (Method 1311)		
Inorganics:		
• Antimony	1	6010 / 7041
• Arsenic	1.8	6010 / 7060
• Barium	100	6010 / 7080
• Beryllium	0.1	6010 / 7090
• Cadmium	0.5	6010 / 7130
• Chromium	5	6010 / 7190
• Lead	1.5	6010 / 7420
• Mercury	0.2	7470
• Nickel	70	6010 / 7520
• Selenium	1	6010 / 7740
• Silver	5	6010 / 7760
Volatile Organics:		
• Benzene	0.5	8240 / 8260
• Carbon disulfide	400	8240 / 8260
• Chlorobenzene	6	8240 / 8260
• Chloroform	70	8240 / 8260
• 1,2-Dichloroethane	0.5	8240 / 8260
• 1,4-Dioxane	30	8240 / 8260
• Ethylbenzene	400	8240 / 8260
• Ethylene dibromide	0	8240 / 8260
• Methyl ethyl ketone	200	8240 / 8260
• Styrene	70	8240 / 8260
• Toluene	1000	8240 / 8260
• Xylenes (total)	7000	8240 / 8260
Semivolatile Organics:		
• Anthracene	1050	8270
• Bis(2-ethylhexyl) phthalate	30	8270
• Butyl benzyl phthalate	700	8270
• Cresol, total	200	8270
• 1,4-Dichlorobenzene	7.5	8270
• Diethyl phthalate	3000	8270
• 2,4-Dimethylphenol	70	8270
• 2,4-Dinitrophenol	7	8270
• Di(n)butyl phthalate	400	8270
• Di(n)octyl phthalate	400	8270
• Fluoranthene	140	8270
• Phenol	5.9	8270
• Pyrene	4	8270
• Pyridine	2000	8270

(1) Regulatory levels lare identified in Appendix 1 of 30 TAC Chapter 335, Subchapter R
Unless noted otherwise, regulatory levels are in mg/L

(2) Analytical methods are identified in Test Methods for Evaluating Solid waste, Physical/Chemical Methods, USEPA SW-846

(3) Analytical method is identified in Methods of Chemical Analysis of Water and Wastes , USEPA 600/4-79-020.

Table IV.D-5

Volatile Organic Concentrations and Analytical Methods - Tier 4

Alon USA LP - Big Spring Refinery

PARAMETERS	REGULATORY LEVEL[1]	ANALYTICAL METHOD
Organic Air Emission Parameters:		
• Subpart BB (Volatile Organics)	> 10% by weight organics	8260[2]
• Subpart CC (Volatile Organics)	> 500 parts per million by weight	Method 25D[3]

(1) The regulatory levels are identified in the technical ammendments to the rule published on February 9, 1996

(2) Analytical methods are identified in Test Methods for Evaluating Solid waste, Physical/Chemical Methods, USEPA SW-846

(3) The analytical method is described in 40 CFR Part 60, Appendix a

Table IV.D-6

Waste Sampling Location & Equipment

Alon USA LP - Big Spring Refinery -

WASTES	SAMPLING LOCATION	SAMPLING EQUIPMENT
Chromium-Contaminated Soil	Affected Area or Container	Scoop or trowel
Spent Filters with benzene	Nitrogen stripper Unit	Grab
Heat Exchanger Bundle Cleaning Sludge	Bundle Cleaning Slab	Scoop
Merox Unit Sand Filter Media	Merox Unit	Scoop
Spent Caustic Solution in Water	FCCU Unit	Dipper or Scoop
DiGlycolAmine in Oil/Water Solution	FCCU Unit	Dipper or Scoop
Scal Fuel	Scal Unit	Grab
Tank Bottom cleanout scale & solids	Tank or from a Roll-Off Box	Dipper or Scoop
Slop oil emulsion sludge from separation of recoverable oil	Filter Cake at RVF Unit/Plate and Frame Filter Press Unit	Grab or Scoop
Ignitable spill cleanup soils	Affected Area or Container	Scoop or trowel
Spent Catalyst Mo/Co on Alumina	Distallation Unit	Grab or Scoop
Spent catalyst from reforming operations	Catalyst Reformer Unit	Grab or Scoop
Chromate impacted soils and concrete	Affected Area or Container	Grab
Merox Unit Disulfide Seperator material	Merox Unit	Scoop or trowel
Equipment cleanout solids with Cresols	Equipment Location or Container	Scoop or trowel
Reactive Petroleum Materials	Tank or from a Roll-Off Box	Dipper, Scoop, or Trowel
Hydrocarbons, mixed and misc. </=140^{o}F	Container Storage Area C	Dipper
Petroleum contaminated Solids	Affected Area or Container	Scoop or trowel
Spill-Cleanup Aromatic Materials	Affected Area or Container	Scoop or trowel
Primary oil/water/solids separation sludge (dewatered)	Sumps, sewers, pipelines	Grab or Scoop
Recovered groundwater from remediation activities	Recovery Well or container	Bailer or Dipper
Process wastewater to be processed in on-site WWT unit (discharges under NPDES permit)	Influent	Dipper
Spent carbon	Stripper Unit	Grab
Lead contaminated soils	Affected Area or Container	Scoop or trowel
Crude oil tank bottoms	Tank or from a Roll-Off Box	Grab or Scoop
Clarified slurry oil tank sediment	Tank or from a Roll-Off Box	Dipper or Scoop
Tank Bottom Sludge from Tank Cleanouts	Tank or from a Roll-Off Box	Dipper or Scoop
Spent Catalyst from reforming of naphtha	Reformer Unit	Grab or Scoop
Waste paint and paint related material (ignitable)	Container	Dipper or Scoop
Spent Metal Halide and Sodium Lamps	Container	Scoop
Spent Catalyst Co/Ni/Mo on Alumina	Distallation Unit	Grab or Scoop

Table IV.D-6

Waste Sampling Location & Equipment

Alon USA LP - Big Spring Refinery -

WASTES	SAMPLING LOCATION	SAMPLING EQUIPMENT
Lead Contaminated Soils from cleanup operations	Affected Area or Container	Grab or Scoop
Spent Hydrotreating Catalyst	Hydrotreater Unit	Grab or Scoop
API Separator sludge	Separator or trowel	Scoop or trowel
Primary/Secondary oil/water/solid separator wastewater sludge	RVF Unit/Plate and Frame Filter Press Unit	Grab or Scoop
Flammable Hazardous Chemical Lab Waste	Individual Container	Dipper or Pour
Non-Acute Hazardous Chemical Lab Waste	Individual Container	Dipper or Pour
Hazardous Lab Chemical Waste containing radioactive chemicals	Individual Container	Dipper or Pour
Catalyst Passivation and/or Treatment Solution, Spent or Discarded, with metals, hydrocarbons, and mineral acids	Individual Container	Grab or Scoop of Dipper
Off-Spec Halogenated Solvents (discarded from process and production activites)	Individual Container	Dipper
Parts Cleaning Solvent Non-Halogenated	Individual Container	Dipper
Sludge with reactive sulfides generated from cleanup of sour- water stripper unit	Sour-water Stripper Unit or Container	Dipper or Scoop

Table IV.D-7

Waste Sampling Procedures

Alon USA LP - Big Spring Refinery -

PARAMETER	SAMPLE CONTAINER[1]	PRESERVATION METHOD[2]	MAXIMUM HOLDING TIME[3]
SOLIDS AND SLUDGES			
Hazardous Waste Determination Parmeters - Tier 1			
Paint filter test (free liquids)	widemouth glass jar	none	none
Ignitablility (free liquid present)	widemouth glass jar	none	none
Corrosivity	widemouth glass jar	none	none
Reactivity	widemouth glass jar	none	14 days
TCLP Metals (except Mercury)	widemouth glass jar	cool to 4° C	6 months for TCLP, 6 months for
TCLP Mercury	widemouth glass jar	cool to 4° C	28 days for TCLP, 28 days for analysis
TCLP Volatile Organics	widemouth glass jar	cool to 4° C	14 days for TCLP, 14 dayss for analysis
TCLP Semivolatile Organics	widemouth glass jar	cool to 4° C	14 days for TCLP, 7 days for extraction 40 days for analysis
Chemical/Physical Characterization Parameters - Tier 2			
Total Metals (except mercury)	widemouth glass jar	none	6 months for extraction, 6 months for analysis
Total Mercury	widemouth glass jar	cool to 4° C	28 days for extraction, 28 days for analysis
Cyanides (total)	glass jar	cool to 4° C	14 days
Total Volatile Organics	widemouth glass jar	cool to 4° C	14 days
Total Semivolatile Organics	widemouth glass jar	cool to 4° C	14 days for extraction, 40 days for analysis
Oil & Grease	widemouth glass jar	cool to 4° C	28 days
Moisture Content	widemouth glass jar	cool to 4° C	7 days
Solids Content (sludges only)	widemouth glass jar	cool to 4° C	7 days
Total Organic Carbon	widemouth glass jar	cool to 4° C	28 days
Waste Classification Parameters - Tier 3			
Ignitability (free liquids only)	glass jar	none	none
Corrosivity (solids only)	glass jar	none	as soon as possible
Cyanides (total)	glass jar	cool to 4° C	14 days
Total Petroleum Hydrocarbons	widemouth glass jar[4]	cool to 4° C[4]	28 days[4]
TCLP Metals (except	widemouth glass jar	cool to 4° C	6 months for TCLP, 6 months for
TCLP Mercury	widemouth glass jar	cool to 4° C	28 days for TCLP, 28 days for
TCLP Volatile Organics	widemouth glass jar	cool to 4° C	14 days for TCLP, 14 dayss for
TCLP Semivolatile Organics	widemouth glass jar	cool to 4° C	14 days for TCLP, 7 days for extraction 40 days for analysis

Table IV.D-7

Waste Sampling Procedures

Alon USA LP - Big Spring Refinery

PARAMETER	SAMPLE CONTAINER[1]	PRESERVATION METHOD[2]	MAXIMUM HOLDING TIME[3]
SOLIDS AND SLUDGES (continued)			
Organic Air Emission Parameters - Tier 4			
Volatile Organics (Method 8240)	widemouth glass jar	cool to 4° C	14 days
Volatile Organics (Method 25D)	widemouth glass jar	cool to 4° C	14 days
LIQUIDS			
Hazardous Waste Determination Parmeters - Tier 1			
Ignitablility	glass jar	none	none
Corrosivity	glass jar	none	as soon as possible
Reactivity	glass jar	cool to 4° C, NaOH (sodium hydroxide)	14 days
TCLP Metals (except	glass jar	cool to 4° C	6 months for TCLP, 6 months for
TCLP Mercury	glass jar	cool to 4° C	28 days for TCLP, 28 days for
TCLP Volatile Organics	40 milliliter VOA vial	cool to 4° C, HCl (hydrochloric acid)	14 days
TCLP Semivolatile Organics	1 liter amber glass jar	cool to 4° C	7 days for extraction 40 days for analysis
Chemical/Physical Characterization Parameters - Tier 2			
Total Metals (except mercury)	1 liter glass jar	cool to 4° C HNO_3 (nitric acid)	6 months for analysis
Total Mercury	1 liter glass jar	cool to 4° C HNO_3 (nitric acid)	28 days
Cyanides (total)	glass jar	cool to 4° C, NaOH (sodium hydroxide)	14 days
Total Volatile Organics	40 milliliter VOA vial	cool to 4° C, HCl (hydrochloric acid)	14 days
Total Semivolatile Organics	1 liter amber glass jar	cool to 4° C	7 days for extraction,V40 days
Oil & Grease	glass jar	cool to 4° C, HCl (hydrochloric acid)	28 days
Solids Content (sludges only)	glass jar	cool to 4° C	7 days
Total Organic Carbon	1 liter amber glass jar	cool to 4° C H_2SO_4 (sulfuric acid)	28 days
Waste Classification Parameters - Tier 3			
Ignitability (free liquids only)	glass jar	none	none
Cyanides (total)	glass jar	cool to 4° C, NaOH (sodium hydroxide)	14 days
Total Petroleum Hydrocarbons	glass jar[4]	cool to 4° C[4], HCl (hydrochloric acid)	28 days[4]
TCLP Metals (except Mercury)	glass jar	cool to 4° C	6 months for TCLP, 6 months for analysis
TCLP Mercury	glass jar	cool to 4° C	28 days for TCLP, 28 days for
TCLP Volatile Organics	40 milliliter VOA vial	cool to 4° C, HCl (hydrochloric acid)	14 days
TCLP Semivolatile Organics	1 liter amber glass jar	cool to 4° C	7 days for extraction 40 days for analysis

Table IV.D-7

Waste Sampling Procedures

Alon USA LP - Big Spring Refinery

PARAMETER	SAMPLE CONTAINER[1]	PRESERVATION METHOD[2]	MAXIMUM HOLDING TIME[3]
LIQUIDS (continued)			
Organic Air Emission Parameters - Tier 4			
Volatile Organics (Method 8240)	widemouth glass jar	cool to 4^{o} C, HCl (hydrochloric acid)	14 days
Volatile Organics (Method 25D)	widemouth glass jar	cool to 4^{o} C	14 days

(1) Unless other wise noted, the type of sample containers are identified in *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, USEPA SW-846*

(2) Unless otherwise noted, the preservation methods are identified in Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, USEPA SW-846

(3) Unless otherwise noted, the maximum holding times are identified in Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, USEPA SW-846

(4) The type of sample containes, preservation methods, and maximum holding times are identified in *Methods of Chemical Analysis of Water and Wastes, USEPA 600/4-79-020.*

Alon USA, LP
Alon USA Big Spring Refinery
Big Spring, TX

Hazardous Waste Permit 50140 - Part B
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SECTION IV
SUPPLEMENTAL INFORMATION

Section IV – Wastes and Waste Analysis Supplemental Information

IV.A. Waste Management Information

Not a new waste management facility, Not a Hazardous Waste Management capacity expansion

Alon USA, LP
Alon USA Big Spring Refinery
Big Spring, TX

Hazardous Waste Permit 50140 - Part B
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SECTION V
ENGINEERING REPORTS

V. Engineering Reports

Provide all Part B responsive information in Appendix V. When preparing the physical format organize your submittal using the Format of Hazardous Waste permit Application and Instructions.

For multiple units provide an include all Part B responsive information in a separate Appendix for each unit.

The engineering report represents the conceptual basis for the storage, processing, or disposal units at the hazardous waste management (HWM) facility. It should include calculations and other such engineering information as may be necessary to follow the logical development of the facility design. Plans and specifications are an integral part of the report. They should include construction procedures, materials specifications, dimensions, design capacities relative to the volume of wastes (as appropriate), and the information required by 40 CFR 270.14(b)(8), 270.14(b)(10). Since these reports may be incorporated into any issued permit, the report should not include trade names, manufacturers, or vendors of specific materials, equipment, or services unless such information is critical to the technical adequacy of the material. Technical specifications and required performance standards are sufficient to conduct a technical review. For landfills, surface impoundments, and waste piles, a Construction Quality Assurance Plan, which considers the guidance in EPA publication 530-SW-85-014, Minimum Technology Guidance on Double Liner Systems for Landfills and Surface Impoundments; Design, Construction, and Operation, and/or EPA/600/R-93/182, Quality Assurance And Quality Control For Waste Containment Facilities, should be submitted.

For facilities which will receive wastes from off-site sources, the engineering report must also contain information on the units which will manage these off-site wastes in accordance with 30 TAC 335.45(a).

Certain ancillary components or appurtenant devices must be addressed in the Part B application. These include but are not limited to sumps, pipelines, ditches, and canals. The technical information and the level of detail required will vary with the nature, scope, and location of the ancillary component. At a minimum they should be included in descriptions of piping and process flow. More information may be required. A single area containing a large number of ancillary components or a remote appurtenant device in an unusually sensitive location may warrant some specific permit requirements. All ancillary components must be included in calculating closure cost estimates.

In each of the unit-specific sections, describe precautions taken to prevent accidental commingling of incompatible wastes. If reactive or ignitable wastes are to be managed, or if incompatible wastes are deliberately commingled, provide information to ensure that precautions are taken to avoid danger due to:

- generation of extreme heat or pressure, fire, explosion, or violent reaction;
- production of uncontrolled toxic mists, fumes, dusts, or gases in sufficient quantities to threaten human health;
- production of uncontrolled flammable fumes or gases in sufficient quantities to pose a risk of fire or explosion;
- damaging the structural integrity of the device or facility containing the waste; or
- threatening human health or the environment by any other means.

Comprehensive consideration should be given to ensure that the facility is designed in accordance with good public health and hazardous waste management practices. The application will be evaluated primarily for the aspects of design covered by the regulations. Nothing in any approval is intended to relieve the facility owner or operator of any liabilities or responsibilities with respect to the design, construction, or operation of the project.

A. General Engineering Reports

1. General Information

Complete Table V.A. - Facility Waste Management Handling Units listing all past, current or proposed units. *[Indicate units' status as* Active, Closed, Inactive *(built but not yet managing waste)*, Proposed *(not yet built)*, Never Built, Transferred, or Post-Closure. *Indicate appropriate units for Capacity information.]* **Note for renewals and modifications involving adding or dropping units from the permit:** List all TCEQ Permit Unit Numbers that have been assigned previously as in a current permit Attachment D -Authorized Facility Units table and do not reuse or reassign permit numbers for units that have been replaced, closed, removed from the permit, or transferred to other ownership. All Notice of Registration (NOR) Numbers must match the State of Texas Environmental Electronic Reporting System (STEERS) and may not be reused for replacement units.

Provide an overall plan view of the entire facility. Identify each hazardous or industrial solid waste management unit (container storage area, tank, incinerator, etc.) to be permitted in relation to its location and the type of waste managed in that unit. Also provide a plan view at an appropriate scale to clearly show the location of all hazardous waste management units to be permitted on one or more 8 1/2" x 14" sheets. Indicate on this plan view how the design or operation provides for buffer zones or waste segregation as appropriate for incompatible, ignitable, or reactive wastes.

Submit a topographic map or maps of the facility which clearly shows the information specified in 40 CFR 270.14(b)(19), 270.14(c)(3), and 270.14(d)(1)(i) (for large HWM facilities, the TCEQ will allow the use of other scales on a case-by-case basis). Please note that the term "facility" includes all contiguous land, structures, other appurtenances, and improvements on the land for storing, processing, or disposing of hazardous and industrial solid waste.

2. Features to Mitigate Unsuitable Site Characteristics

For all new hazardous waste management storage and/or processing facilities or areal expansions of existing hazardous waste management storage and/or processing facilities, include in the engineering report design, construction, and operational information specified in 30 TAC 335.204(a)(1) and (a)(3) through (9).

3. Construction Schedules

a. In order to meet the required design standards, extensive retrofitting of some facilities may be required. In the worst case, the applicant may elect to close certain operations rather than comply with the RCRA standards. Thus, the permit may specify a schedule of compliance requiring the accomplishment of given tasks within specific time frames. As required, indicate an appropriate schedule(s) of compliance in this application. The schedule should provide for facility compliance as soon as possible and in accordance with 40 CFR 270.33(a)(2) and 270.33(b).

b. For commercial hazardous waste management facilities, permit applications (new, renewal, or interim status applications), major amendments, and Class 3 modifications must include a construction schedule. A construction schedule must be submitted even if the application does not include an addition of units or a revision to permitted units. This schedule should comply with the requirements of 30 TAC 305.149.

4. Provide detailed plans and specifications which when, accompanied by the engineering report, will be sufficiently detailed and complete to allow the Executive Director to ascertain whether the facility will be constructed and operated in compliance with all pertinent permitting requirements. Engineering plans and specifications must be prepared under the supervision of and sealed by a licensed Professional Engineer, with current license, along with the Registered Engineering Firm's name and Registration Number as required by the Texas Engineering Practice Act. For some facilities, plans in the form of a standard piping and instrumentation diagram will be sufficient. Overall dimensions and materials of construction must be shown.

B. Container Storage Areas

1. Provide an engineering report which includes all of the information specified in 40 CFR 264.170-264.173, 264.175-264.177, and 270.15.

Complete Table V.B - Container Storage Areas and list the container storage areas covered by this application to be permitted. List the N.O.R. unit number, the rated capacity or size of each unit (including the maximum number of each type of container to be stored at each unit and total maximum capacity of all types wastes stored in the unit), the areal dimensions, containment volume, aisle space requirements, whether ignitable, reactive, or incompatible waste will be stored in each unit, and whether processing will occur within the unit.

2. Container storage areas must have a containment system that is capable of collecting and holding spills, leaks, and precipitation. In addition to the requirements of 40 CFR 270.15, the design report should include the following:

a. Capacity of the containment relative to the number and volume of containers to be stored; in addition, for unenclosed areas, the amount of rainfall collected prior to removal. The TCEQ recommends using a 25-year, 24-hour rainfall event for this extra capacity; and

b. Run-on into the containment system must be prevented, or a collection system with sufficient excess capacity must be provided. If run-on is collected within the containment system, delineate the area(s) from which run-on is collected. The 25-year, 24-hour rainfall event should be used to calculate the excess capacity.

3. Wastes Containing No Free Liquids

With the exception of 40 CFR 264.175(d), storage areas that hold only wastes that do not contain free liquids need not have a containment system, provided that compliance with 40 CFR 264.175(c) is demonstrated. This demonstration must be submitted as part of the application and must include:

a. test procedures and results or other documentation or information to show that the wastes do not contain free liquids; and

b. a description of how the storage area is designed or operated to drain and remove liquids or how containers are kept from contact with standing

liquids.

4. Managing Ignitable or Reactive Wastes

   If a container storage area will manage ignitable or reactive waste, as indicated on Table V.B, provide in the engineering report drawings demonstrating compliance with the buffer zone requirement of 40 CFR 264.17 and 264.176.

5. Managing Incompatible Wastes

   If a container storage area will manage incompatible waste, as indicated on Table V.B, provide in the engineering report a description of the procedures used to ensure compliance with 40 CFR 264.17 and 264.177.

6. Managing Nonhazardous Wastes and/or Universal Wastes

   If a container storage area will manage nonhazardous wastes, and/or universal wastes in addition to hazardous waste, provide a description of all types of wastes managed in the engineering report and procedures used to ensure compliance with 40 CFR 264 Subpart I.

C. Tanks and Tank Systems -RESERVED

D. Surface Impoundments - RESERVED

E. Waste Piles -RESERVED

F. Land Treatment Units

Provide an engineering report which includes all of the information specified in 30 TAC 305.50(a)(6), 335.171, 335.172, 40 CFR 264.270-264.272, 264.273, 264.276, 264.278, 264.279, 264.281-264.283, and 270.20 for each land treatment unit.

For land treatment units at a new hazardous waste management facility or which are part of an areal expansion of an existing hazardous waste management facility, include in the engineering report design, construction, and operational information specified in 30 TAC 335.204(b).

For all land treatment units, include in the report the following information.

1. Complete Tables V.F.1 - Land Treatment Units and V.F.2 - Land Treatment Unit Capacity and list the land treatment units covered by this application. List the waste(s) managed in each unit and the rated capacity or size of the unit. If different wastes are placed on separate portions of the land treatment area, each portion is considered a land treatment unit, and requires a separate summary form and engineering report.

   The treatment zone is defined as the soil area of the unsaturated zone of a land treatment unit within which hazardous constituents are degraded, transformed, or immobilized. In this section, specify the depth of the treatment zone. The maximum depth of the treatment zone for new land treatment units must be [40 CFR 264.271(c)]:

   a. No more than 1.5 meters (5 feet) from the surface; and

   b. More than 1 meter (3 feet) above the seasonal high water table.

2. If a land treatment unit will manage ignitable or reactive waste, as indicated on Table V.F.1, describe in the engineering report the procedures used to ensure compliance with 40 CFR 264.17 and 264.281.

3. If a land treatment unit will manage incompatible waste, as indicated on Table

V.F.1, describe in the engineering report the procedures used to ensure compliance with 40 CFR 264.17 and 264.282.

4. If a land treatment unit will manage F020, F021, F022, F023, F026 and F027 waste, as indicated on Table V.F.1, describe in the engineering report the procedures used to ensure compliance with 40 CFR 264.283.

5. Describe the land treatment unit. The report shall include all the information requested in this section including drawings. At a minimum, a plan view and cross-section of the unit should be included with the engineering report.

6. Complete Table V.F.3. - Land Treatment Principal Hazardous Constituents and list the wastes for which the treatment demonstration will be made and the principal hazardous constituents in each waste. Specify in the report the data sources to be used to make the demonstration such as laboratory data, field data, operating data, literature, or other.

7. Run-on Diversion

   Describe in detail the measures used to control run-on and divert run-on from the unit. Include all the analyses used to calculate the run-on volumes.

   The owner or operator must design, construct, operate, and maintain a run-on control system capable of preventing flow onto the active portion of the land treatment unit during peak discharge from a 100-year, 24-hour storm. [30 TAC 335.171(3)]

   Collection holding facilities (e.g., tanks or basins) associated with the run-on control system must be emptied or otherwise managed expeditiously after storms to maintain the design capacity of the system. [30 TAC 335.171(5)].

8. Run-off Control

   Describe in detail the measures used to control the run-off from the unit, and minimize hazardous constituents in the run-off, include all the analyses used to calculate the run-off volumes.

   The owner or operator must design, construct, operate and maintain a run-off management system to collect and control at least the water volume resulting from a 100-year, 24-hour storm. [30 TAC 335.171(4)]

   Collection and holding facilities (e.g., tanks or basins) associated with run-off control systems must be emptied or otherwise managed expeditiously after storms to maintain design capacity of the system. [30 TAC 335.171(5)]

9. Wind Dispersal

   The owner or operator of a land treatment unit containing hazardous waste which could be subject to dispersal by wind must cover or otherwise manage the land treatment unit so that wind dispersal is minimized. Describe practices to control wind dispersal (e.g., cover or frequent wetting) of the hazardous waste. [30 TAC 335.171(6)]

10. Treatment Demonstration

A description of the treatment demonstration required under 40 CFR 264.272 and 270.20(a) shall be included with the engineering report. If the owner or operator intends to conduct field tests or laboratory analyses in order to make the demonstration, he must obtain a treatment or disposal permit.

11. The owner or operator must establish an unsaturated zone monitoring program in accordance with 40 CFR 264.278 and a detailed monitoring program must be included in the application.

12. Food Chain Crops [40 CFR 264.276]

Several conditions must be satisfied if food-chain crops are to be grown in or on the treatment zone. A demonstration must be prepared similar to the one described in the Treatment Demonstration and submitted at least 90 days prior to the planting of crops. The demonstration need not be submitted with this application. However, a description of the demonstration must be included as part of the engineering report. This demonstration may be combined with the Treatment Demonstration description, as some of the information required is identical.

G. Landfills -RESERVED

H. Incinerators -RESERVED

I. Boilers and Industrial Furnaces -RESERVED

J. Drip Pads -RESERVED

K. Miscellaneous Units -RESERVED

L. Containment Buildings -RESERVED

Alon USA, LP
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Big Spring, TX

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APPENDIX V
APPLICATION RESPONSES
Engineering Reports

Alon USA, LP
Alon USA Big Spring Refinery
Big Spring, TX

Hazardous Waste Permit 50140 - Part B
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SECTION V
TABLES

Table V.A. - Facility Waste Management Handling Units

TCEQ Permit Unit No. [1]	Unit Name	NOR No.[1]	Unit Description[3]	Capacity	Unit Status[2]
001	Site E LTU	005	Closed Land Treatment Unit	690,000,000 lbs	Closed as Landfill
003	Site H LTU	010	Closed Land Treatment Unit	490,000,000 lbs	Closed as Landfill
004	CSA Area A	001	Container Storage Area	160, 55-gallon drums	Active
005	CSA Area B	020	Container Storage Area	160, 55-gallon drums	Active
006	CSA Area C	021	Container Storage Area	80, 55-gallon drums	Active

1. Permitted Unit No. and NOR No. cannot be reassigned to new units or used more than once and all units that were in the Attachment D of a previously issued permit must be listed.

2. Unit Status options: Active, Closed, Inactive (built but not managing waste), Proposed (not yet built), Never Built, Transferred, Post-Closure.

3. If a unit has been transferred, the applicant should indicate which facility/permit it has been transferred to in the Unit Description column of Table V.A.

Table V.B. - Container Storage Area

Permit Unit No.	Container Storage Area	N.O.R. No.	Waste Nos.[4]	Rated Capacity[3]	Dimensions	Containment Volume (including rainfall for unenclosed areas)	Unit will manage Ignitable[1], Reactive[1], or Incompatible[2] waste (state all that apply)	Unit Status
004	CSA-A	001	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12	160, 55-gallon drums	9-ft x 45-ft	na	Ignitable	Active
005	CSA-B	020	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12	160, 55-gallon drums	9-ft x 45-ft	na	Ignitable	Active
006	CSA-C	021	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12	80, 55-gallon drums	10-ft x 30-ft	1,520 gallons	Ignitable, Reactive	Active

1. Containers managing ignitable or reactive waste must be located at least 15 meters (50 feet) from the facility's property line.
2. Incompatible waste must be separated from other waste or materials stored nearby in other containers, piles, open tanks, or surface impoundments by means of a dike, berm, wall, or other device.
3. Container Storage Areas need to include in capacity calculations any nonhazardous wastes and universal wastes managed in the unit in addition to hazardous wastes.
4. from Table IV.B, first column

Table V.F.1 - Land Treatment Units

Permit Unit No.	Land Treatment Unit	N.O.R. No.	Waste Nos.[1, 2]	Dimensions[3]	Distance from lowest liner to groundwater	Unit will manage Ignitable, Reactive,Incompatible, or F020, F021, F022, F023, F026, and F027 Waste (state all that apply)	Unit Status
001	SITE E	005	4, 12, 17, 32	Length 730-feet Width 3 60-feet Depth 5-feet ~6 acres	~75-feet	NONE	Post-Closure
003	SITE H	010	4, 8, 10, 12, 16, 17, 21, 22, 23, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37	Length 550-feet Width 430-feet Depth 5-feet ~5 acres	~112-feet	NONE	Post-closure

1. From Table IV.B, first column
2. If cadmium is present in the waste, state the concentration in the report.
3. Dimensions should be provided as average length, width and depth, also include the surface acreage for the unit.

Table V.F.2. - Land Treatment Unit Capacity

For the land treatment units listed in Table IV.F.1, specify the waste treatment capacity.

Permit Unit No.*	Land Treatment Unit	N.O.R. No.	Rated Capacity				Treatment Zone Depth
			Monthly Hydraulic Loading	Monthly Organic Loading	Monthly Inorganic Loading	Cumulative Lifetime Loading	
001	SITE E [CLOSED]	005	300,000 lbs/acre	75,000 lbs/acre	225,000 lbs/acre	690,000,000 lbs	5-feet
003	SITE H [CLOSED]	010	27,000 lbs/acre	12,000 lbs/acre	42,000 lbs/acre	490,000,000 lbs	4.5-feet

* This number should match the Permit Unit No. given on Table V.F.1.

Table V.F.3. - Land Treatment Principal Hazardous Constituents

List the wastes for which the demonstration will be made and the principal hazardous constituents in each waste. Indicate by an (*) asterisk which constituents will be treated and rendered nonhazardous.

Waste	Hazardous Constituents
NOT APPLICABLE - BOTH LAND TREATMENT UNITS ARE CLOSED AND IN POST-CLOSURE	

Alon USA, LP
Alon Big Spring Refinery – Big Spring, TX

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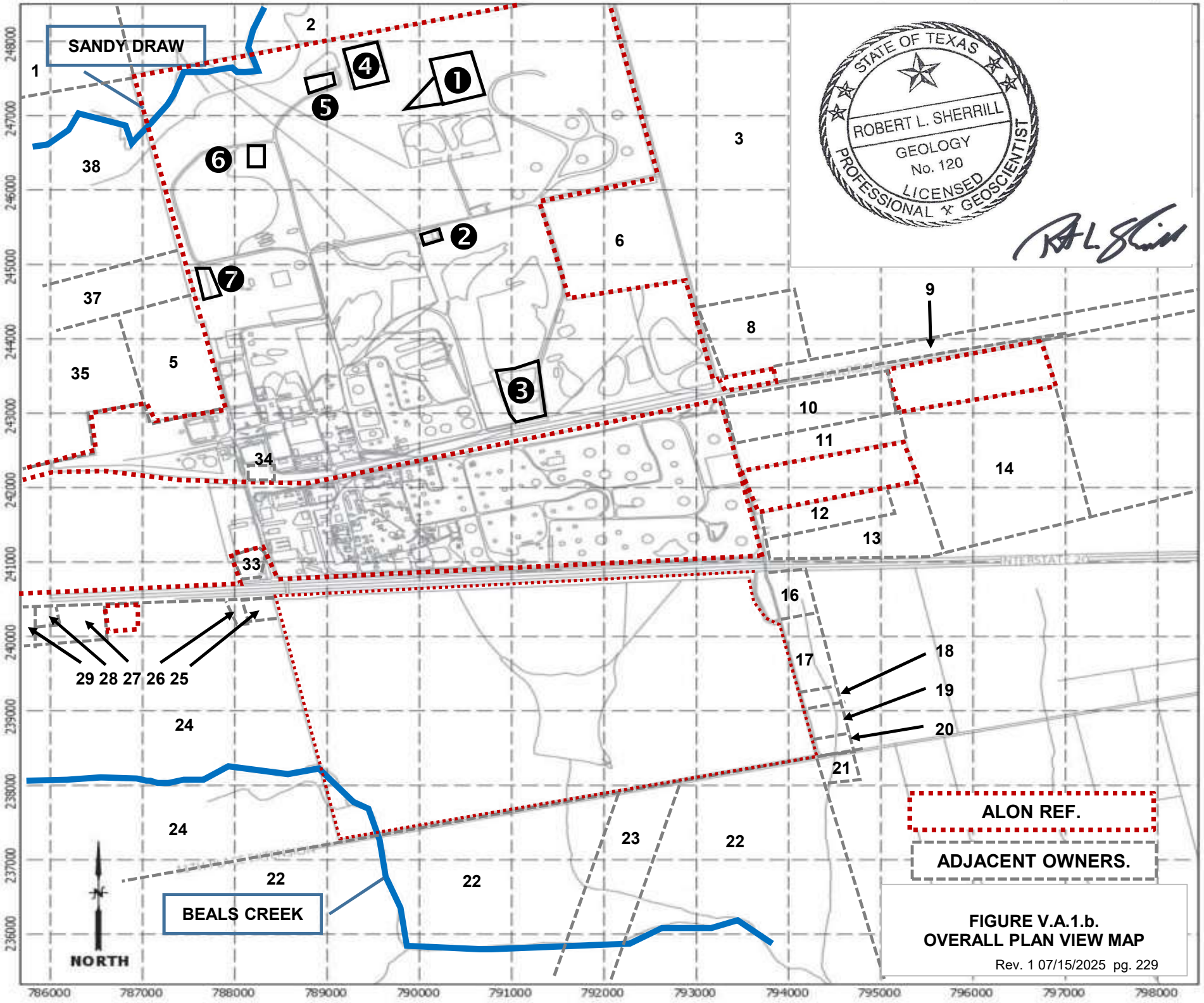
SECTION V
FIGURE



STATE OF TEXAS
ROBERT L. SHERRILL
GEOLOGY
No. 120
LICENSED
PROFESSIONAL GEOSCIENTIST

FIGURE V.A.1.b.
OVERALL PLAN VIEW MAP

FIGURE V.A.1.b.

OVERALL PLAN VIEW MAP

WASTE DISPOSAL ACTIVITIES	
❶ SITE H - Closed Land Treatment Unit in Post-Closure	❺ SITE F - Asphalt Disposal Unit [Active]
❷ CONTAINER STORAGE AREA - Active	❻ UNIT B - NH Office Waste Landfill [Active]
❸ SITE E - Closed Land Treatment Unit in Post-Closure	❼ SITE L - Asbestos Landfill [Active]
❹ SITE K - Concrete Disposal [Active}	

ADJACENT LANDOWNERS:	LAND USE
1 Howard County	Undeveloped
2 Ronald & Sherry White	Mostly undeveloped with pipeline service pads
3 NP Johnson Family LTD Partnership	Sand pit and salt waster disposal well
5 Power Resources Inc.	Undeveloped
6 Sid Richardson, Carbon LTD	Industrial Plant
8 Ronald T. Genn	Undeveloped
9 Moore Development Big Spring	Railroad Frontage
10 Kent Bennett	Industrial
11 Midland Frac Oil Co.	Industrial
12 NOLA B Corporation	Industrial
13 Randy Paige	Industrial
14 Dale Coates	Undeveloped
16 James Manley Denton	Undeveloped
17 R Dirt Company LLC, DBA Red Dirt	Industrial
18 Brandie Jetton	Industrial
19 Robert M. Henson, DBA Henson Wrecking	Industrial
20 R.E. & Beverly Smithie	Industrial
21 Hydro Dynamics Inc.	Industrial
22 Lazy J, LTD	East - Industrial, West - Undeveloped
23 Jack Cathey Construction Co.	Industrial
24 City of Big Spring	Municipal Landfill
25 International Union of Oper. Engineers, Local #826	Office
26 Tommy Williams	Undeveloped
27 Linda Caldwell, Aaron & James Tucker	Industrial
28 JH & Bobby Tucker	Industrial
29 RLR Investments LLC	Industrial
33 Cactus Paint Manufacturing	Industrial
34 Oncor Electric Delivery Company	Industrial
35 HP Kirchner III	Undeveloped
37 Elsie Jean Neill	Undeveloped
38 Virginia Erskine	Undeveloped

Big Spring McMahon-Wrinkle Airport

32.21°N, 101.52°W (780 m asl).
Model: ERA5T.

met

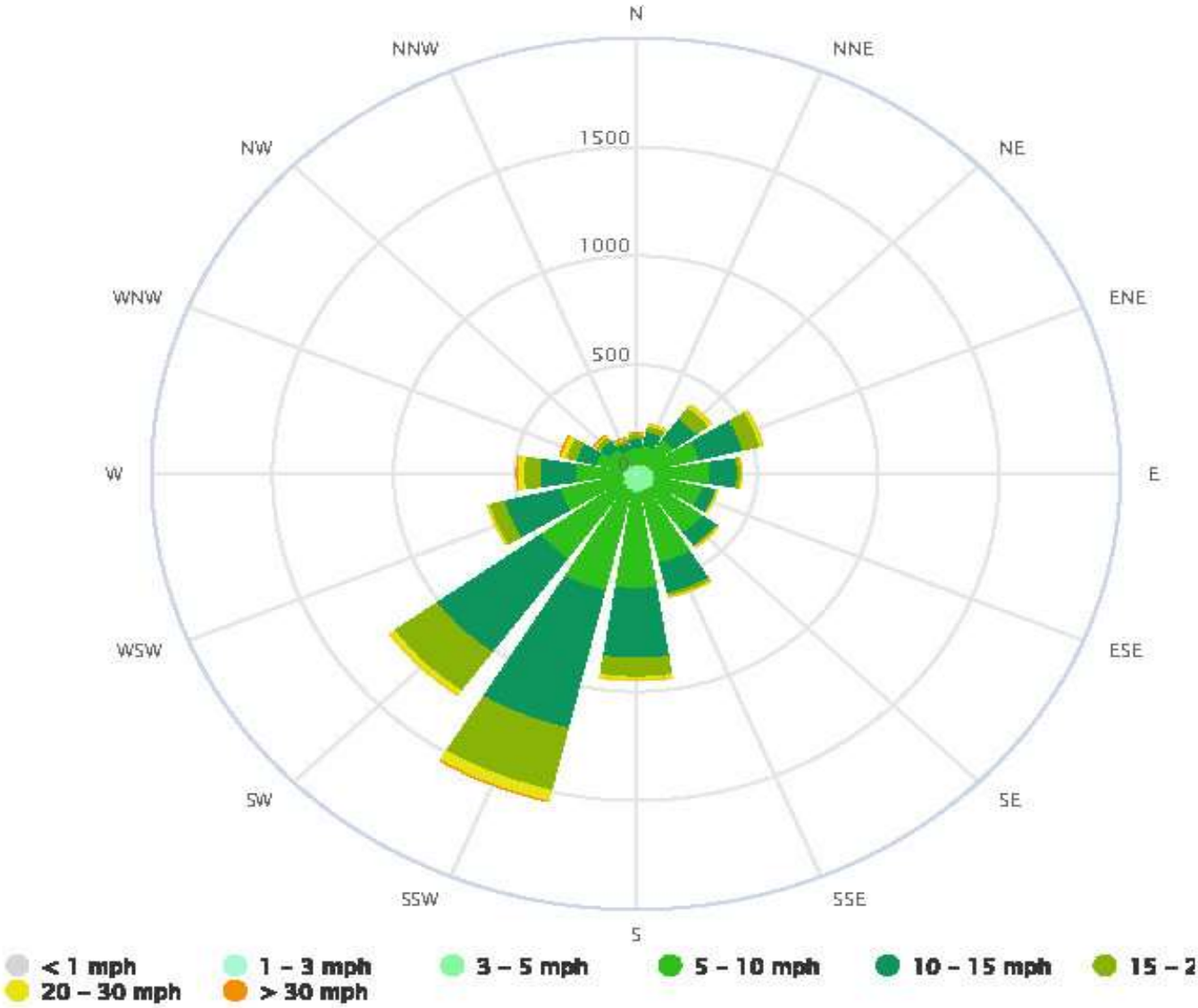
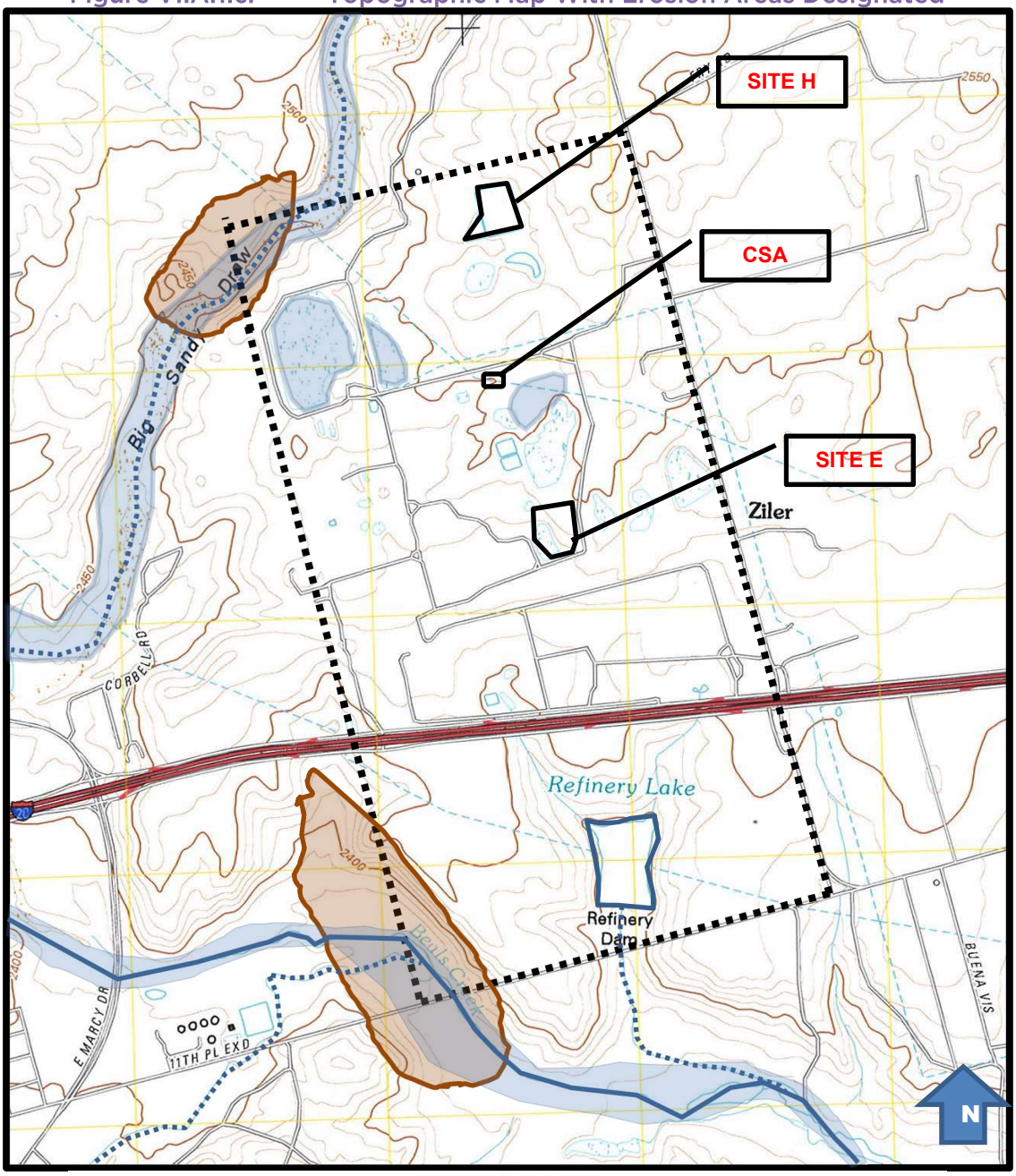


Figure VI.A.1.c. Topographic Map With Erosion Areas Designated



SCALE 1:24 000

1 0.5 0 KILOMETERS 1 2

1000 500 0 METERS 1000 2000

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MILES

1000 0 1000 2000 3000 4000 5000 6000 7000 8000 9000 10000

FEET

CONTOUR INTERVAL 10 FEET

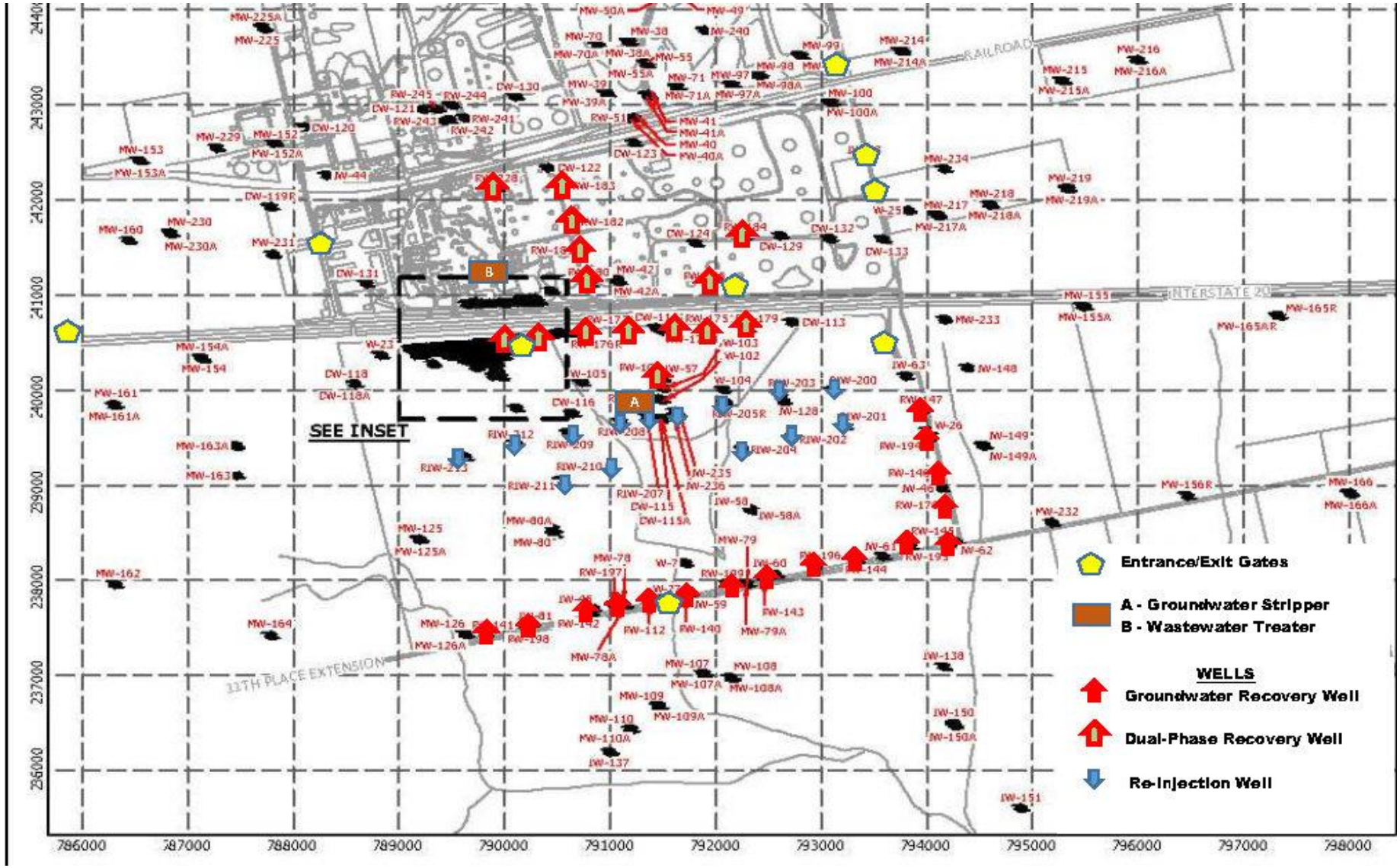
This map was produced to conform with version 0.5.10 of the draft USGS Standards for 7.5-Minute Quadrangle Maps. A metadata file associated with this product is also draft version 0.5.10

Areas of On-going Wind & Water Erosion

100-Year Flood Plane

Source: US Geological Survey, Big Spring Sheet, 2002

Figure V.A.1.d. Production & Injection Wells



Alon USA, LP
Alon USA Big Spring Refinery
Big Spring, TX

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SECTION V
APPENDIX V.A.
GENERAL ENGINEERING REPORT

Alon Big Spring Refinery

Compliance Plan CP-50140
Appendix V.A.
GENERAL ENGINEERING REPORTS
SWR No. 30083 / RN100250869 / CN 600881873

Alon Big Spring Refinery - Big Spring, Texas

April 5, 2024

Kyle Hagen, P.E.
Engineer

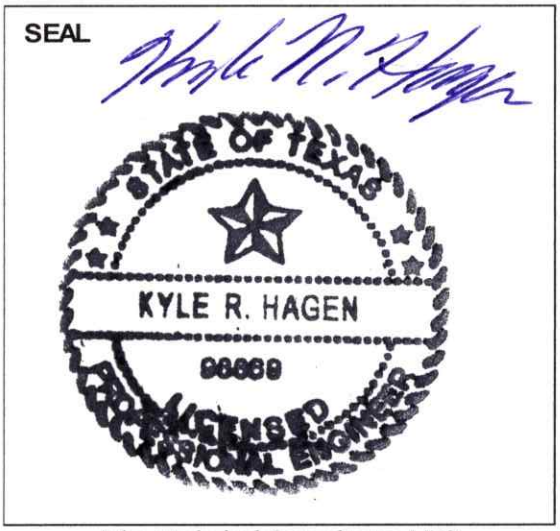
Signature

Texas #98869
License Number & State

F-19813
Texas Engineering Firm Registration Number

6/3/2024
Date

SEAL



Atlas Technical Consultants, LLC
Texas Registered Engineering Firm F-19813

NOTE: This professional engineer certification is provided to certify the summary, verification of the status, and general ongoing activities at the Container Storage Unit, Site E LTU and the Site H LTU. This certification is not provided for the engineering design or to certify closure or post closure care of these units.

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1.3 Operating Procedures and Equipment 1-2
1.4 Power Outages and Equipment Failure 1-2
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Figure V.A-2 Topographic Map
Figure V.A-3 100-Year Flood Map

SECTION 1 GENERAL ENGINEERING REPORTS

Three hazardous waste management (HWM) units at the Alon USA Big Spring Refinery are subject to permitting in this renewal application. These HWM units are identified on the plot is included as Figure V.A-1 and are identified as follows:

- Container Storage Area (active)
- Site H Land Treatment Unit (inactive, closure pending)
- Site E Land Treatment Unit (closed, under post-closure care)

1.1 General Information

The Container Storage Area is located north of the process areas of the Alon USA Big Spring Refinery (owned by DELEKUS) and well within the boundaries of the facility. This HWM unit is comprised of three individual storage areas constructed as six-inch asphalt pads for the storage of drummed solid hazardous wastes (Areas A and B) and a six-inch concrete pad (with curbs and a sump) for the storage of drummed liquid hazardous wastes. The Container Storage Area is currently active.

The Site H Land Treatment Unit is located about 2,000 feet northeast of the Container Storage Area, also within the boundaries of the facility. This HWM unit was constructed in conformance with the Minimum Technology Requirements (MTRs) as established by the EPA for landfills and surface impoundments. The Site H Land Treatment Unit was backfilled with a mixture of native soils and imported clay to produce a land treatment zone (LTZ) that effectively supported processes that could degrade, transform, or immobilize the hazardous constituents in the wastes applied to the active areas of the unit. A stormwater collection/retention pond was constructed for the LTU for the management of stormwater runoff. A run-on diversion drainage system was provided by compacted clay dikes and graded surface drainage channels. The Site H Land Treatment Unit began receiving waste in 1989, but the unit is currently closed and has not received wastes since December 19, 1994 (effective date of land-disposal restrictions for all hazardous wastes). *As* Alon USA Big Spring Refinery formally withdrew its petition for a no-migration variance from the EPA in July 1997 (thereby eliminating the possible future use of the unit for the application of hazardous wastes), closure of the Site H Land Treatment Unit was closed and post-closure monitoring began on June 09, 2004.

The Site E Land Treatment Unit is located about 2,500 feet southeast of the Container Storage Area, also within the boundaries of the facility. The Site E Land Treatment Unit was utilized for the application of hazardous wastes from 1976 to 1988. Since the Site E Land Treatment Unit is located above two former surface impoundments (WP-7A and WP-29) that were used to store wastes similar to those applied to this HWM unit, difficulty arose in determining whether contamination within the underlying ground water resulted from potential releases from the Site E Land Treatment Unit or the underlying former impoundments. As a result, closure of the Site E Land Treatment Unit commenced in 1988 and was completed in 1995 with the installation of a composite cover system over the Site E area. Closure certification was approved in 1996 and the Site E Land Treatment Unit has been under post-closure care since that time.

1.2 Detailed Plans and Specifications

Final engineering plans and specifications, sealed by a Registered Texas Professional Engineer, were developed for the construction of the Container Storage Area and the Site E Land Treatment Unit and submitted to the Texas Water Commission (TWC), a predecessor agency to the Texas Department of Environmental Quality (TCEQ), with the original permit application in 1985. Detailed engineering plans and specifications, sealed by a Registered Texas Professional Engineer, were developed for the construction of the Site H Land Treatment Unit and submitted to the TWC on August 26,1988 as an addendum to the revised Part B Application submitted on May 6,1988.

A more detailed engineering report for each of these HWM units is presented in Appendix V.B. (Container Storage Area) and Appendix V.F (Site ELand Treatment Unit and Site H Land Treatment Unit).

1.3 Operating Procedures and Equipment

Safe operation requires proper use of equipment and facilities. Appropriate operating procedures and equipment are described in various applicable sections of this permit renewal application.

1.4 Power Outages and Equipment Failure

Electric power is not currently used directly or indirectly in any of the existing HWM facilities. However, electric power is required for the pumping of leachate from the collection cells of the Site H Land Treatment Unit and the pumping of water from the associated Stormwater Collection Pond. Only long-term power outages would conceivably affect operations at the Site H Land Treatment Unit. Also, storage capacity will be available in the Stormwater Collection Pond and leachate collection system and if necessary, these can be isolated by the manual closing of valves. Power outages do not represent a risk of waste release from any of the HWM units.

Mechanical equipment is used to transport drummed waste to the Container Storage Area. Equipment is also used to remove drums from the Container Storage Area and to till and irrigate the Site H Land Treatment Unit. The activities performed by the mechanical equipment are not particularly time-critical from an environmental standpoint. A short-term breakdown of equipment does not present a risk of waste release. However, it is obvious that in order to operate within established design parameters, adequately sized and reliable mechanical equipment must be available and properly maintained.

Waste is transported to the Container Storage Area in lots of four drums to a pallet. Failure of equipment during drum handling could result in a release of waste. However, a waste release incident is unlikely to involve more than four drums (i.e., the amount of waste transported on a pallet at one time).

1.5 Waste Spills, Contaminated Runoff, and Contamination of Water Supplies

Wastes are transferred between various points on the Alon USA Big Spring Refinery property. Except for wastes that are disposed of offsite and carried by a licensed transporter, wastes are transported only within the boundaries of the refinery.

The maximum quantity of waste that is potentially subject to spill during transfer would be 2,000 gallons (2,000 gallons of sludge resulting from a spill of one truckload). General surface runoff from both the process and non-process areas of the plant site is ultimately directed to Refinery Lake (WP-6) on Fina property. No flow of contained waters over the spillway of WP-6 occurs under normal operating and weather conditions.

The likelihood of ground-water contamination resulting from a waste spill is relatively small since the uppermost aquifer is protected by a thick unsaturated zone. Also, the small volume of waste subject to potential spillage and the quick response time for such an accident mitigate against the possibility of ground-water contamination.

1.6 Ancillary Components

The hazardous waste handling facilities to be permitted depend on simplicity of design for reliability in operation. Any ancillary and/or appurtenant devices used in waste management are described in sections of the specific engineering report for that particular HWM unit.

1.7 Topographic Map

A map depicting the topography within a one-mile radius of the Fina facility is provided as Figure V.A-2. This topographic map has been prepared on a 1″ = 2000′ scale with 2′ contour intervals.

1.8 Flooding

The most recent available 100-year flood map (December 1977) is provided as Figure V.A-3. However, in the area of the Site E Land Treatment Unit, the markings indicating this area to be in the 100-year floodplain are inaccurate. The topography shown is that which previously existed before construction of the Site E Land Treatment Unit and shows the outline of the two surface impoundments (WP-7A and WP-29) that are overlain by this HWM unit. The Site E Land Treatment Unit was closed in 1995 and the cover system raised the topography higher so that the final height of the unit is well above that of the surrounding area (and therefore presents no risk of flooding during the 100-year flood event).

The other areas denoted as being within the 100-year floodplain (Zone A) represent the areal extents of former surface impoundments prior to being deactivated and backfilled. None of the hazardous waste management units subject to permitting in this renewal application (Container Storage Area, Site H Land Treatment Unit, or Site E Land Treatment Unit) is within the 100-year floodplain.

Big Sandy Draw drains an extensive area around the refinery property. The flood map indicates that the floodway and floodplain of this surface-water body are over one-half mile to the west of the hazardous waste management units (at the closest point).

FIGURES

- Figure V.A.-1 Plot Plan
- Figure V.A.-2 Topographic Map
- Figure V.A.-3 100-year Flood Map

Figure V.A.-1 Plot Plan

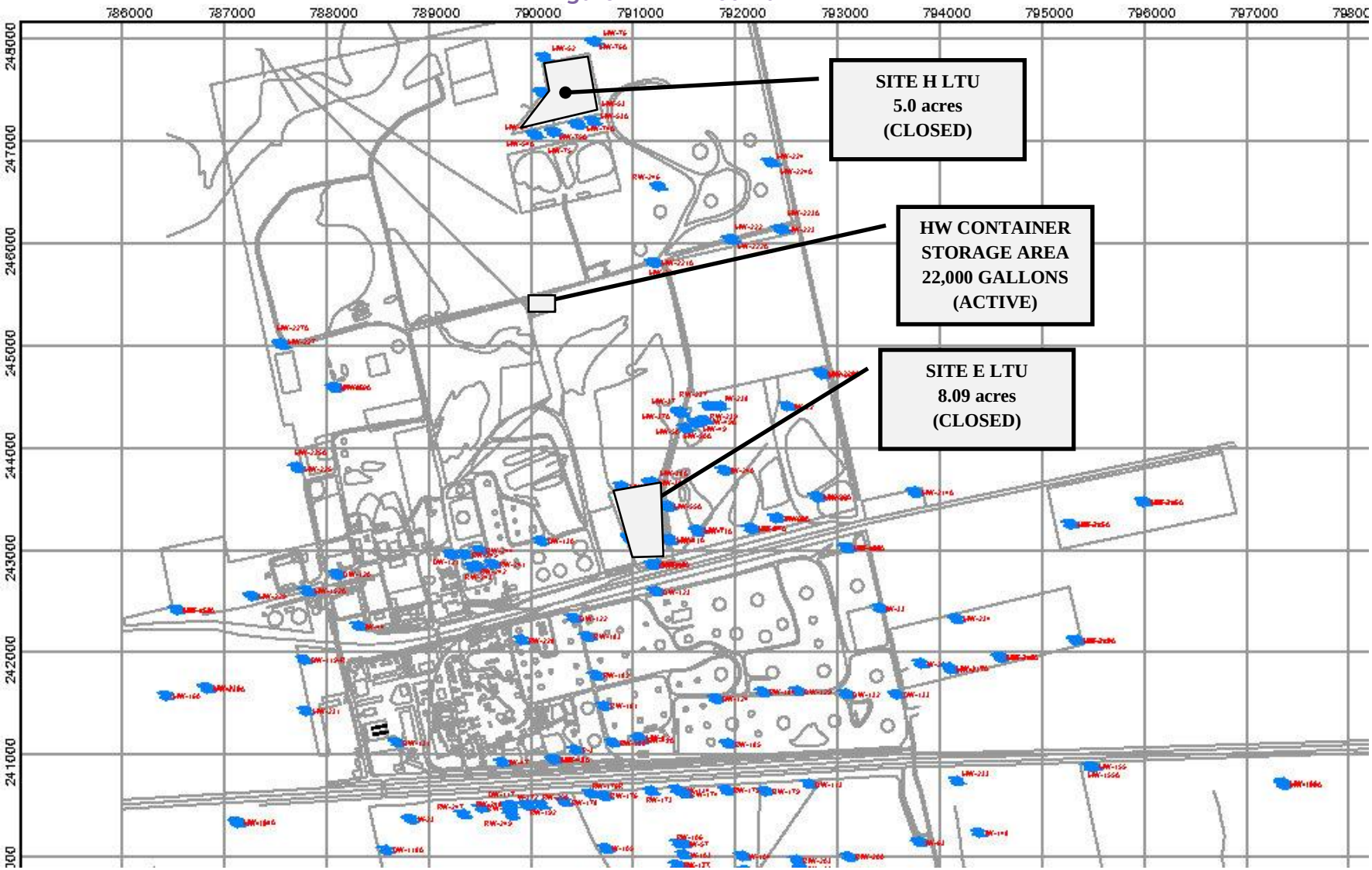


Figure V.A.-2 Site Location Map

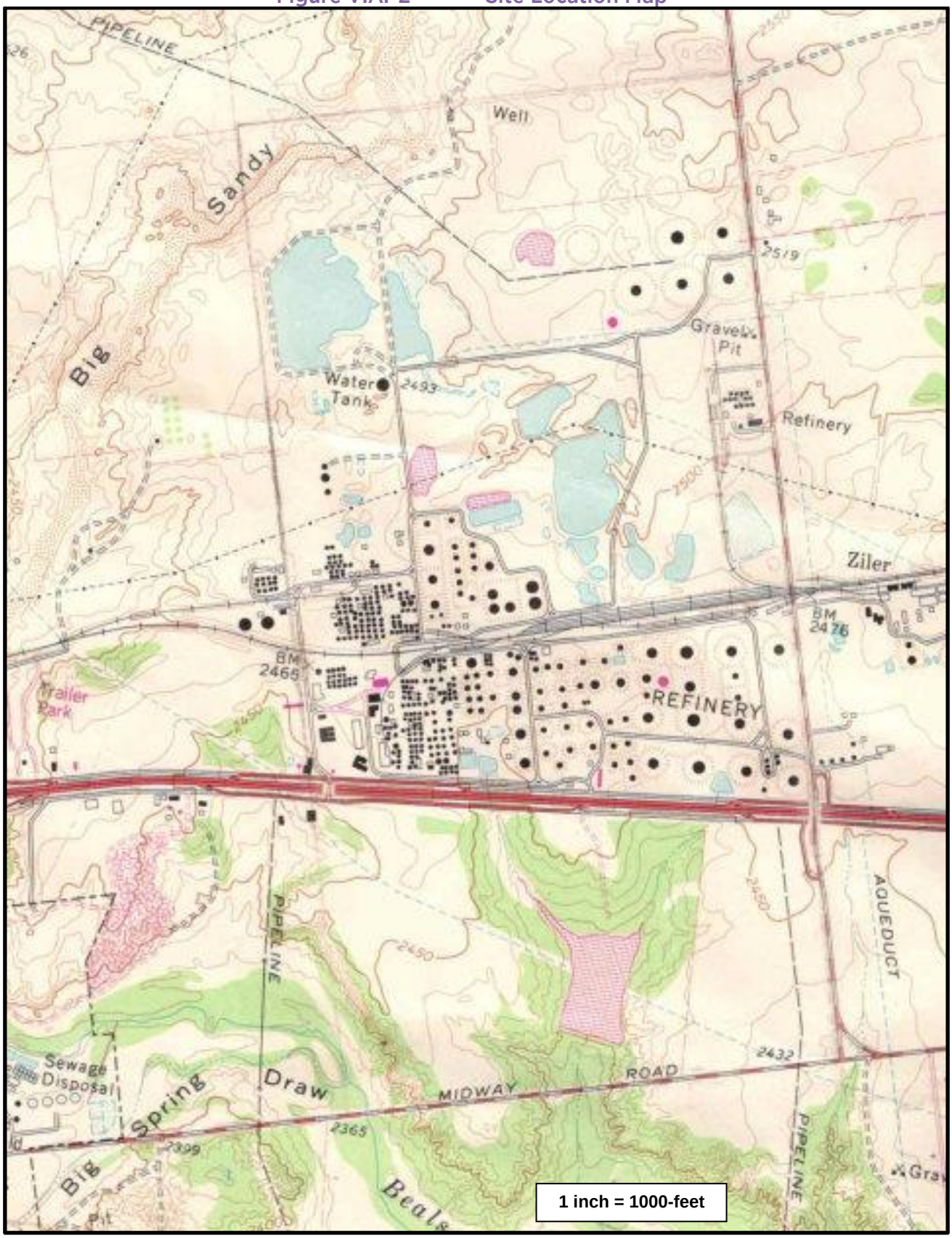
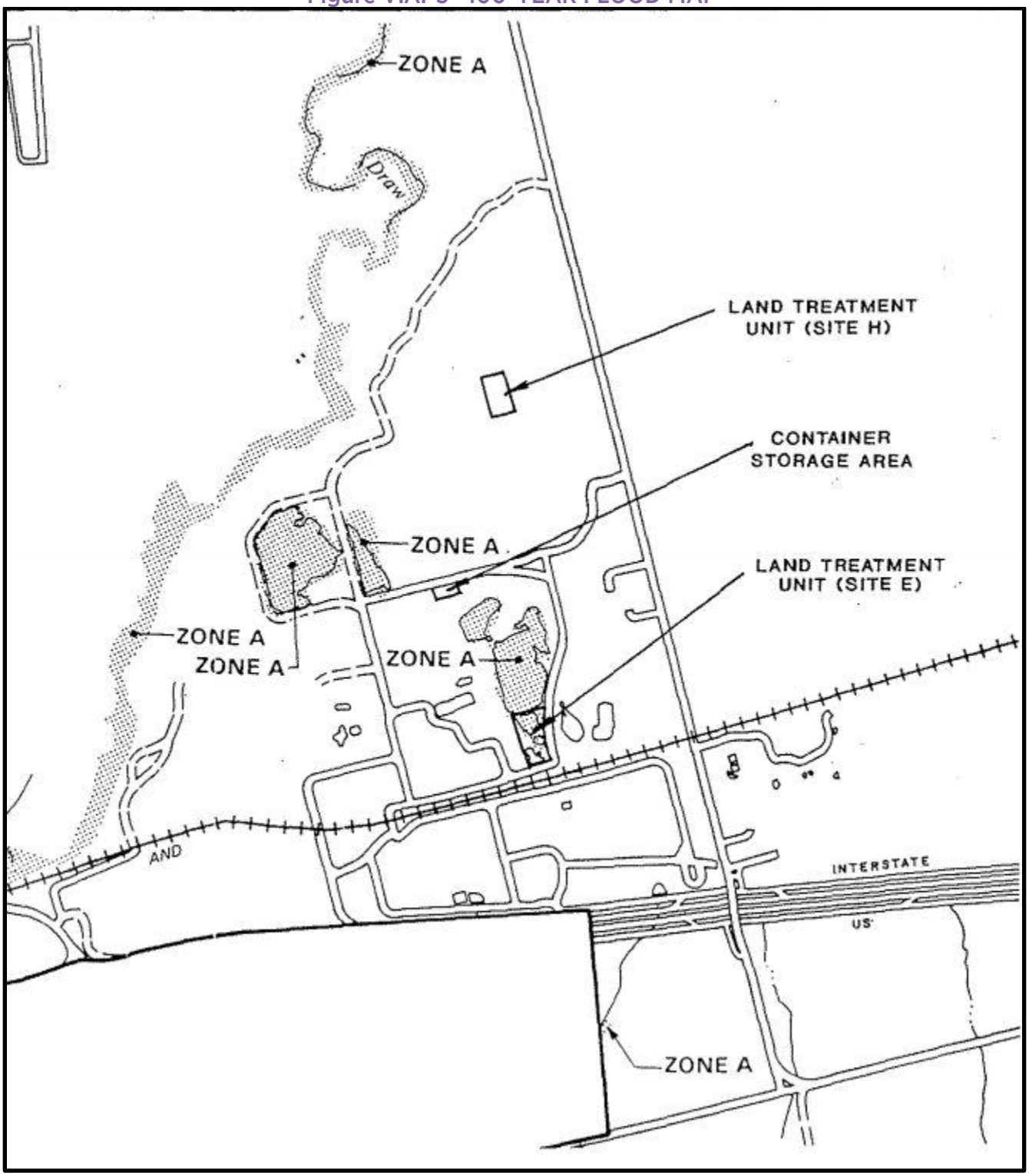


Figure V.A.-3 100-YEAR FLOOD MAP



Alon USA, LP
Alon USA Big Spring Refinery
Big Spring, TX

Hazardous Waste Permit 50140 - Part B
Application SWR No. 30083 / RN100250869 / CN600881873

SECTION V
APPENDIX V.B.
CONTAINER STORAGE AREA ENGINEERING REPORT

Alon Big Spring Refinery

Compliance Plan CP-50140
Appendix V.B.
CONTAINER STORAGE AREA ENGINEERING REPORT
SWR No. 30083 / RN100250869 / CN 600881873

Alon Big Spring Refinery - Big Spring, Texas

April 5, 2024

Kyle Hagen, P.E.
Engineer

Signature

Texas #98869
License Number & State

F-19813
Texas Engineering Firm Registration Number

6/3/2024
Date

SEAL

Atlas Technical Consultants, LLC
Texas Registered Engineering Firm F-19813

NOTE: This professional engineer certification is provided to certify the summary, verification of the status, and general ongoing activities at the Container Storage Unit. This certification is not provided for the engineering design or to certify closure or post closure care of these units.

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Figure V.B-1 Container Storage Area Plot Plan
Figure V.B-2 Run-On/Run-Off Control
Figure V.B-3 Containment Facility- Container Storage Area "C"
Figure V.B-4 25-Year, 24-Hour Rainfall Map
Figure V.B-5 Container Storage Area Inventory Control

SECTION 1 CONTAINER STORAGE AREA

The hazardous waste Container Storage Area (CSA) that Alon USA Big Spring Refinery (Alon) is seeking to permit in this renewal application is located in a remote area of the facility on an asphalt pad (see Figure V.A-1 in Appendix V.A). The CSA is divided into separate storage areas (Areas A, B, and C). The CSA is accessible from a service road on the north side of the asphalt paving. Materials stored in the CSA are contained in steel drums and the drums are set on pallets for ease of handling. The pallets also serve to elevate the drums above the ambient surface, thereby keeping the bottom of the drums out of any water that may accumulate on the asphalt during wet weather.

Materials that are stored in the CSA include drummed solid and liquid hazardous wastes. Containers of waste materials with no free liquids are stored on pallets, directly on the asphalt (Areas A and B). Containers with wastes containing free liquids are stored on pallets placed on a curbed concrete pad (Area C). The pad drains to a concrete sump designed to contain any leakage that may occur and collect precipitation that falls on the pad. Examples of the materials presently stored include solid spent catalysts and liquid spent solvents.

1.1 Storage Capacity

- Figure V.B-1 is a plot plan showing the layout of the three waste storage areas that comprise the CSA. The spent catalyst storage area (Area A) and miscellaneous solids storage area (Area B) represent locations for containers of solid material (no free liquids). Area A provides for storage of drums containing ignitable and/or reactive and/or toxicity characteristic (TC) materials and includes a buffer zone. Each of the two solid material storage areas is designed to accommodate 160 containers, 55-gallons in size.

The total area for storage of drums containing free liquids (Area C) is designed to accommodate 80 drums, 55-gallons in size. This design capacity includes a curbed concrete pad and containment sump.

1.2 Wastes Containing No Free Liquids

Drums containing spent catalyst wastes are placed on pallets in Area A and drums containing miscellaneous solid wastes are stored on pallets in Area B. The pallets are approximately five inches in height and rest on a surface paved with asphalt. The paving, coupled with a moderate slope from northeast to southwest, assures that the area is well drained. Run-on and runoff control for the CSA is depicted on Figure V.B-2.

Drums to be stored in Areas A and B are visually inspected for free liquids. If there is any doubt that the waste may contain free liquids, then the waste is tested in accordance with the Paint Filter Test (SW-846, Method 9095) to assure the drums do not contain free liquids. If free liquids are present in the waste as determined visually or by testing, then the waste is stored in the liquid drum storage area (Area C).

- Run-On Required to Overtop the One-Foot Diversion Wall

  The flow rate to flood the one-foot high wall can be estimated by the equation Q_{25} =VA.

  where: Q_{25} =Required 25-year run-on in ft3/sec (cfs)

  V = Flow velocity based on slope in ft/ sec

  A = Cross-sectional area of flow in ft2

Using a cross slope at the diversion wall of 0.75% and a sheet flow condition, the estimated flow velocity of 1.75 cfs is established.**

** This value taken from State Department of Highways Hydraulics Manual, 3rd Edition, Hydrology Section, Figure 5, Page 2-24.

Utilizing the 1.5% slope provided on the site, 45 feet of backwater distance would be required to overtop the eight-inch wall. The cross sectional area of this flow would be:

A= (0.5)(45 feet)(8 inches/12) = 15 ft^2

The discharge required to overtop the eight-inch wall would be:

Q = AV = (15 ft2) x (1.75 ft/ sec) = 26.25 cfs

Since the $Q_{req} > Q_{actual}$ or 26.25 cfs> 1 cfs, the proposed eight-inch high diversion wall will not be overtopped by run-on in the 25-year storm event.

The drums containing liquids are placed on wooden pallets on the curbed concrete pad, thus assuring that the drums will not be standing in liquid at any time. The CSA and surrounding area slopes gently from the north-northeast to the south-southwest. A pitched road prevents run-on into the CSA from the north. Area C (dedicated to liquid storage) is further protected from run-on by being elevated above the ambient level of the surrounding asphalt area.

Liquids collected in the containment sump of Area C consist of rain water and/or any leakage that may occur. When liquids are present in the containment sump, they are examined to determine whether they consist of water, water and a water soluble solvent, and/ or a wate insoluble solvent. After this determination is made, the liquids are disposed of as follows:

Water and water slightly contaminated with drum leakage	Picked up and transported by vacuum truck and drained into the refinery wastewater treatment system.
Water heavily contaminated with soluble drum leakage	The mixture will be pumped into clean, tight drums and placed in the drum storage area.
Drum leakage (and minor quantities of water)	Drum leakage will be transferred to clean, tight drums and placed in storage area.

In order to expedite removal of liquids from the containment sump, samples of such liquids are collected immediately on discovery and examined as expeditiously as possible. When examination of the samples is complete, final disposition of the liquids will be made as outlined

Run-On Required to Overtop the One-Foot Diversion Wall

The flow rate to flood the one-foot high wall can be estimated by the equation Q25 =VA. The following calculations are taken from Texas Department of Transportation Hydraulic Design Manual, Open-Channel Flow Section, Equations 6-2 and 6-3, Page 6-3 and Table 10-23 for Manning's n-value.

where: Q25=Required 25-year run-on in ft3/sec (cfs)

V = Flow velocity based on slope in ft/ sec = z/n*R2/3*S1/2

Where, z = 1.486

n = Manning's roughness coefficient = 0.013 for smooth pavement

R = hydraulic radius (ft) = A/WP where WP = wetted perimeter = 45 ft

= A/WP = 15 ft2/45 ft = 0.333 where A = cross-section area of flow in ft2 = 0.5*45 feet*(8inches/12) = 15 ft2

S = slope = 0.75% = 0.0075 ft/ft

Using a cross slope at the diversion wall of 0.75% and a sheet flow condition, the estimated flow velocity is calculated as follows:

V = 1.486/0.013 * (0.333)2/3 * (0.0075)1/2 = 4.75 fps

Utilizing the 1.5% slope provided on the site, 45 feet of backwater distance would be required to overtop the eight-inch wall. The cross sectional area of this flow would be:

A = Cross-sectional area of flow in ft2 = (0.5)(45 feet)(8 inches/12) = 15 ft2

The discharge required to overtop the eight-inch wall would be:

Q25 = AV = (15 ft2) x (4.75 ft/ sec) =71.3 cfs.

Since the Qreq> Qactua1 or 71.3 cfs> 1 cfs, the proposed eight-inch high diversion wall will not be overtopped by run-on in the 25-year storm event.

The drums containing liquids are placed on wooden pallets on the curbed concrete pad, thus assuring that the drums will not be standing in liquid at any time. The CSA and surrounding area slopes gently from the north-northeast to the south-southwest. A pitched road prevents run-on into the CSA from the north. Area C (dedicated to liquid storage) is further protected from run-on by being elevated above the ambient level of the surrounding asphalt area.

Liquids collected in the containment sump of Area C consist of rain water and/or any leakage that may occur. When liquids are present in the containment sump, they are examined to determine whether they consist of water, water and a water soluble solvent, and/ or a wate insoluble solvent. After this determination is made, the liquids are disposed of as follows:

Water and water slightly contaminated with drum leakage	Picked up and transported by vacuum truck and drained into the refinery wastewater treatment system.
Water heavily contaminated with soluble drum leakage	The mixture will be pumped into clean, tight drums and placed in the drum storage area.
Drum leakage (and minor quantities of water)	Drum leakage will be transferred to clean, tight drums and placed in storage area.

In order to expedite removal of liquids from the containment sump, samples of such liquids are collected immediately on discovery and examined as expeditiously as possible. When examination of the samples is complete, final disposition of the liquids will be made as outlined

above.

1.4 Special Requirements for Ignitable or Reactive Wastes

Wastes such as spent catalysts, which are ignitable and/or reactive and/or TC, are stored in a dedicated area of the CSA (Area A). Other TC solids are stored in Area B. There is a 50-foot buffer zone between Areas A and B. In addition, the distance between the edge of the CSA and the property boundary is greater than 800 feet.

1.5 Requirements for Incompatible Wastes

Alon will not store incompatible wastes in the same containers or in adjacent containers within the CSA.

1.6 Operations

Drummed wastes are placed in the CSA are evaluated for structural integrity before placement Drums are also inspected weekly for signs of leakage, corrosion, or pressure buildup. If any of these conditions are found, immediate action is taken to replace the drum and clean up leakage, if any. The drum inspection program is a regular activity each week for the environmental department. When an irregularity is identified, it is noted on the inspection report. The inspection form then becomes the work order for the day, specifying such actions as the emptying of sumps, the replacement of drums, etc. This inspection ensures that hazardous waste containers are always kept closed during storage and not opened, handled, or stored in a manner that may cause them to rupture or leak. Movement of drums will occur only when placing or removing them from storage.

When a drum is found to need replacement or to be leaking, its contents are transferred to an appropriately lined replacement drum. The old drum will be decontaminated as required, with the rinsate being stored in an appropriate container if necessary. As an alternative, the old drum and contents may be "over-packed" into appropriately lined 85-gallon drums designed for this purpose. Any drum found to be significantly corroded will be replaced as outlined above.

Should any solid materials stored in Areas A or B spill, they are cleaned up by transferring any spilled waste material to a new appropriate drum and cleaning the area appropriately. Shovels, scoops, and brooms are used to collect the wastes from the asphalt pad.
Should any liquid materials stored in Area C spill or leak, they can be quickly and safely cleaned up by pumping it from the sump via an on-site vacuum truck. When a sump is found to contain liquids, or liquids are found on the floor of Area C, the liquids are routed into the sump to facilitate transfer by an on-site vacuum truck. Sorbent materials are available, but their use is reserved for small seeps of fluids too small in volume to warrant pumping. Fina will demonstrate that rainfall collected in the sump is not hazardous waste in accordance with 40 CFR 261.3(d). This demonstration will document that the waste does not exhibit any of the characteristics of hazardous waste identified in Subpart C and does not contain a waste listed in Subpart D.

- Personnel protective and safety equipment is available with immediate and direct radio contact with the Emergency Coordinator, consistent with the Refinery Safety Plan.
- The following wastes are to be stored in the CSA:

Waste	EPA Hazardous Waste Number	Storage Area
Spent Catalyst, Co/Mo Alumina	D001, D003, D004	Area A
Spent Reformer Catalyst	D003	Area A
Spent Catalyst, Ni/Mo on Alumina	D001, D003, D004	Area A
Spent Catalyst, Co/Ni/Mo on Alumina	D001, D003, D004	Area A
Spent Hydrotreating Catalyst	D018	Area A
Chromate Bearing Solids	D007	Area B
Lead-Contaminated Soil	D008	Area B
Spent Solvents	D001, D018, D039	Area C
Hydrocarbons, Mixed and Misc.	D001, D018	Area C

KEY

DOO1	Ignitable
D003	Reactive
D004	Toxicity Characteristic- Arsenic
D007	Toxicity Characteristic *w* Chromium
D018	Toxicity Characteristic- Benzene
D039	Toxicity Characteristic- Tetrachloroethylene

The CSA is managed in accordance with 40 CFR §264.175. Since the drums in Areas A and B contain no free liquids, the operation and maintenance of these areas will meet the requirement of 40 CFR §264.175(c). Any spilled residues collected at A and B sites are swept up and redrummed as hazardous waste. No residues are allowed to remain on the asphalt pads.

Area C stores containerized free liquids identified as spent solvents and miscellaneous hydrocarbons and meets the requirements of 40 CFR §264.175(b). The spill residues and cleanup rinsate are collected from the sump and then directed to the API separator where the hydrocarbons are recovered and stored in the slop oil tank pending reprocessing back through the refinery.

1.7 Recordkeeping

It is essential that the Hazardous Waste Coordinator (HWC) be aware of the number of drums and the contents of each drum in the CSA at any time. The HWC is responsible for final disposition of the drums and therefore must have complete knowledge of the CSA inventory.

The HWC, or a delegated agent, maintains a record file containing information on all materials in the CSA. Each container is identified by a permanent marking (number). The contents of each drum and the date of transfer to the CSA are kept on file. The person and/or department originating the transfer to storage is responsible for identifying the drums and will attest to the contents utilizing the inventory control form shown in Figure V.B-5.

When drums are transferred out of the CSA, the HWC prepares a manifest based on the inventory records.

1.8 Container Specifications

DOT Hazard Classes
The wastes stored in the CSA may fall into four DOT hazard classes:

DOT C!ass	DOT Shipping Number	Waste
Flammable Solid	UN1325	Spent catalysts
Flammable Liquid	UN1993	Spent solvents/hydrocarbons
Combustible Liquid	NA 1993	Spent solvents/hydrocarbons
ORM-E	NA 9189	All other hazardous wastes

A flammable material has a flashpoint of less than 140°F. A combustible material has a flash point between 140°F and 200°F.

Packaging
All hazardous wastes stored at the CSA are packaged in 55-gallon steel drums or 86-cubic feet steel flow bins that meet applicable DOT specifications. The drums are either new, used, or reconditioned depending on availability and DOT requirements. Personnel responsible for packaging hazardous wastes are trained to use only drums which have the appropriate DOT specification embossed on a permanent head, footring, or metal plate securely attached to the drum where applicable. Detailed descriptions of the DOT specifications for metal drums can be found in 49 CFR Part 178 Subpart D.

- *Flammable Solids*
  Drums used to contain flammable solids meet DOT specifications 6B, 6C, 17C, 17E, 17H, 37A or 37B. Steel flow bins that contain flammable solids meet DOT Specification 56.

- *Flammable Liquids*
  Flammable liquids are divided into several categories that require drums meeting different DOT specifications:

Flash Point	·' Vapor Pressure	DOT Specs, Metal Drums
≤20°F	16 psi at 100°F	Opening not over 2.3 inches in diameter. 5, 5A, 5B, 5C, 5M, 17E*, 17C
≤20°F to 100°F	≤16 psi at 100°F	5, 5A, 5B, 5C, 5M, 17C, 17E, 17H
<100°F	>16 pst but <27 at 100°F	All of the above except 17E. Bung labels are required as specified in 49 CFR 173.119(1)
<100°F	>27 psi but <40 psi at 100°F	Openings not over 2.3 inches in diameter. 5, 5A, 5P, Bung labels required.

"A drum meeting specification 17E of greater than 30~gallon capacity must be constructed of eighteen-gauge body and head sheets.

Drums meeting specifications 17C, 17E, and 17H are reused for flammable liquids or solids only if:

- Each drum is thoroughly Cleaned to remove all residues and foreign matter.
- Each drum is inspected for deterioration or defects and found sound.
- Each drum is returned to its original shape and contour.
- Closure devices and parts are removed (if removable), inspected, and replaced if

necessary.

- Each open head gasket is replaced.
- The entire surface of each drum (except for removal head and adjacent chime area of openhead drum) is tested for leakage by constant internal air pressure according to 49 CPR §173.28(m)(2) and found not to leak.
- All previous marking and labels are removed and the drum is marked as "Tested" according to 49 CPR §173.28(m)(3)(ii).
- *Other Hazardous Wastes*
  The other hazardous wastes in the CSA are stored in structurally sound 55-gallon steel drums that are marked with letters and numerals identifying a DOT specification as described in 49 CPR 173.24 as applicable. Personnel are trained to inspect all drums for integrity before use.

Marking

Each drum of waste in the CSA is marked with the date the material was first placed in the drum and the words "Hazardous Waste". Prior to shipping, proper DOT shipping name and identification number as given in the "Packaging" section will be placed on the drum. Each drum of hazardous waste is also marked with the following label:

> HAZARDOUS WASTE - Federal Law Prohibits Improper Disposal. If found, contact the nearest police or public safety authority or the U.S. Environmental Protection Agency.

Generator's Name and Address:
Manifest Document Number:

Labeling

DOT labels are required only for the flammable solids and liquids. Labels meet the specifications given in 49 CPR §172.419 and §172.420.

FIGURES

- Figure V.B.-1 Container Storage Area Plot Plan
- Figure V.B.-2 Run-On / Run-Off Control
- Figure V.B.-3 Containment Facility – Container Storage Area "C"
- Figure V.B.-4 25-Year, 24-Hour Rainfall Map
- Figure V.B.-5 Container Storage Area Inventory Control

Figure V.B.-1 Container Storage Area Plot Plan

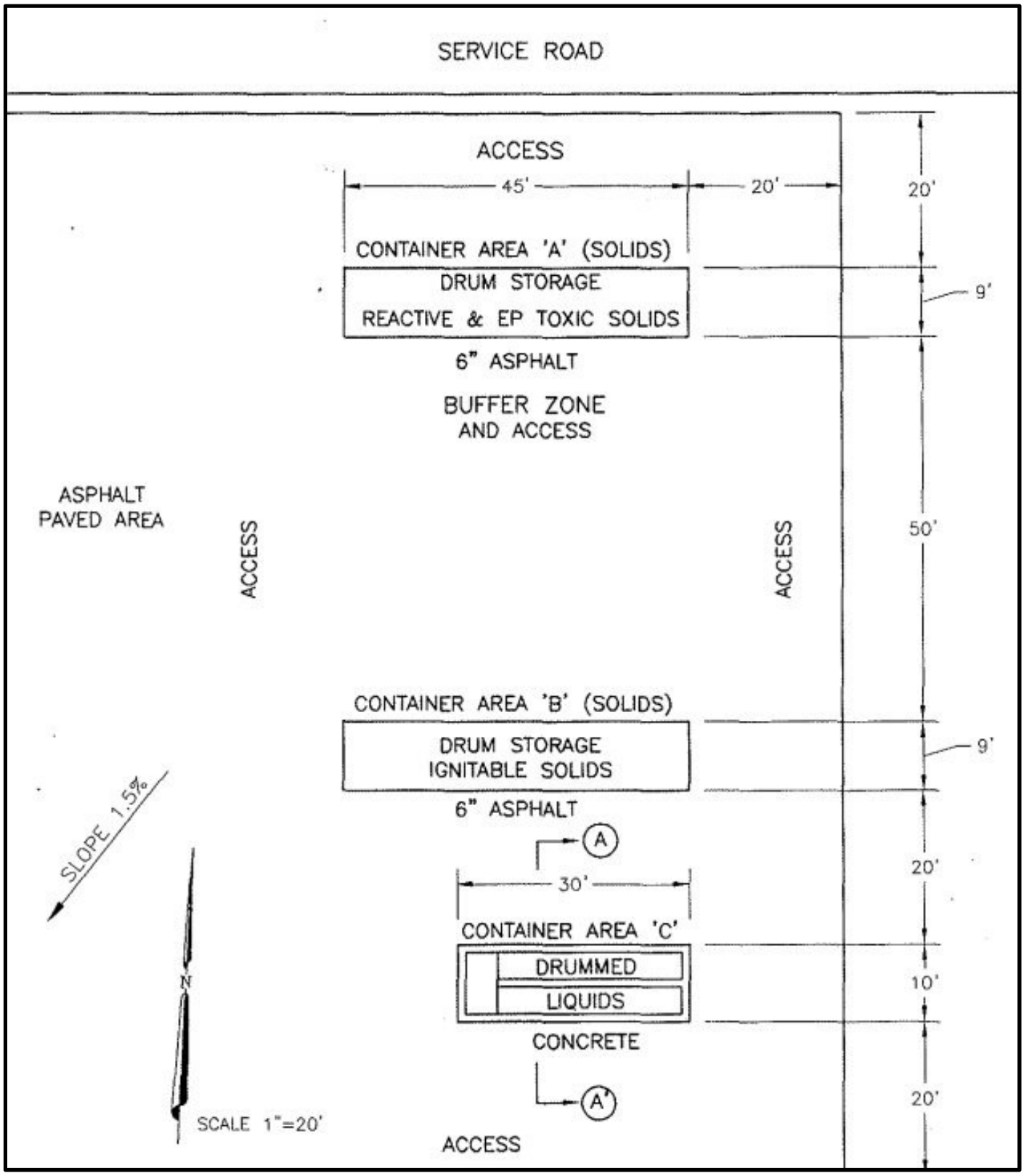

Figure V.B.-2 Run-On / Run-Off Control

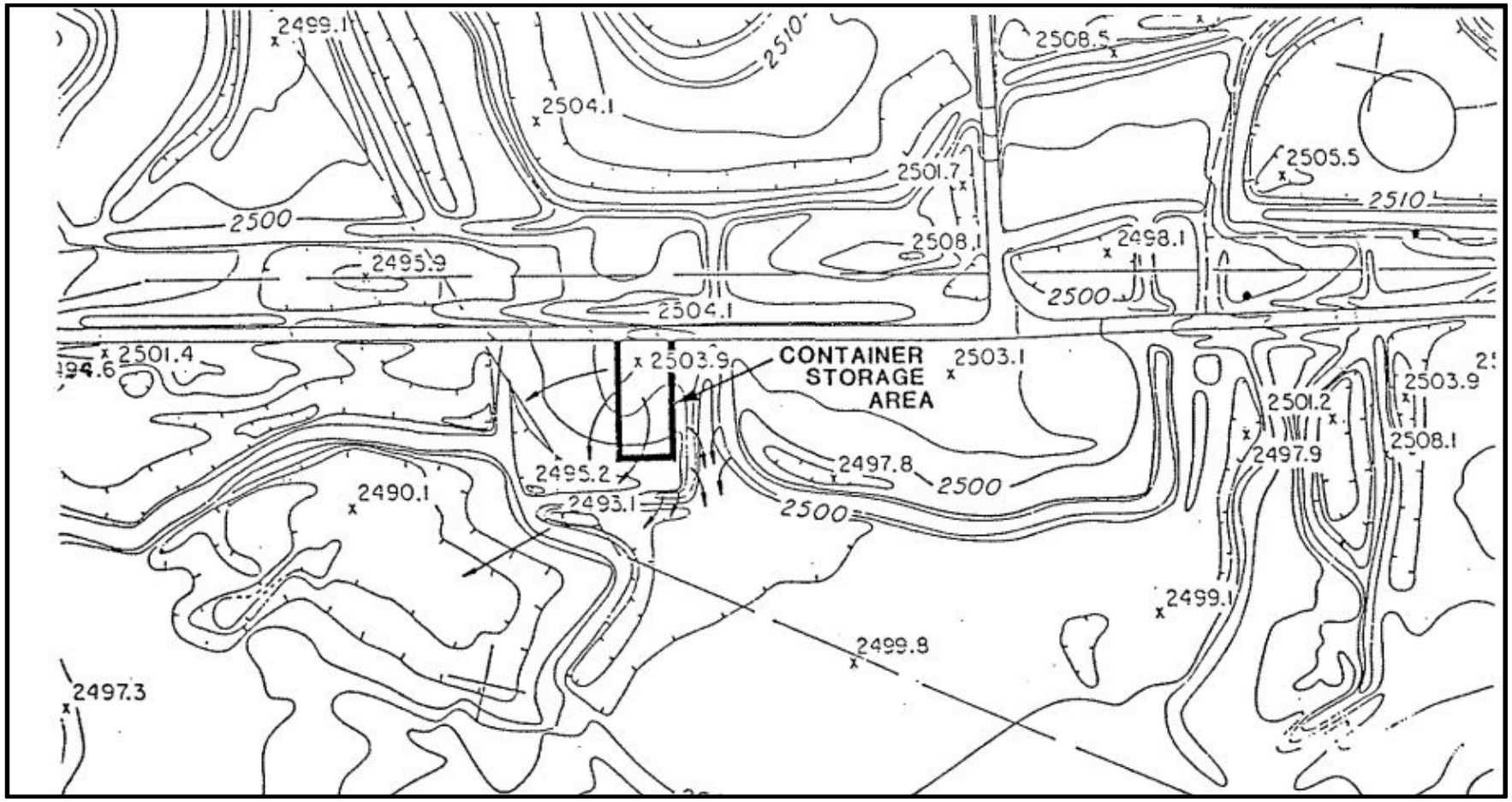

Figure V.B.-3 Containment Facility – Container Storage Area "C"

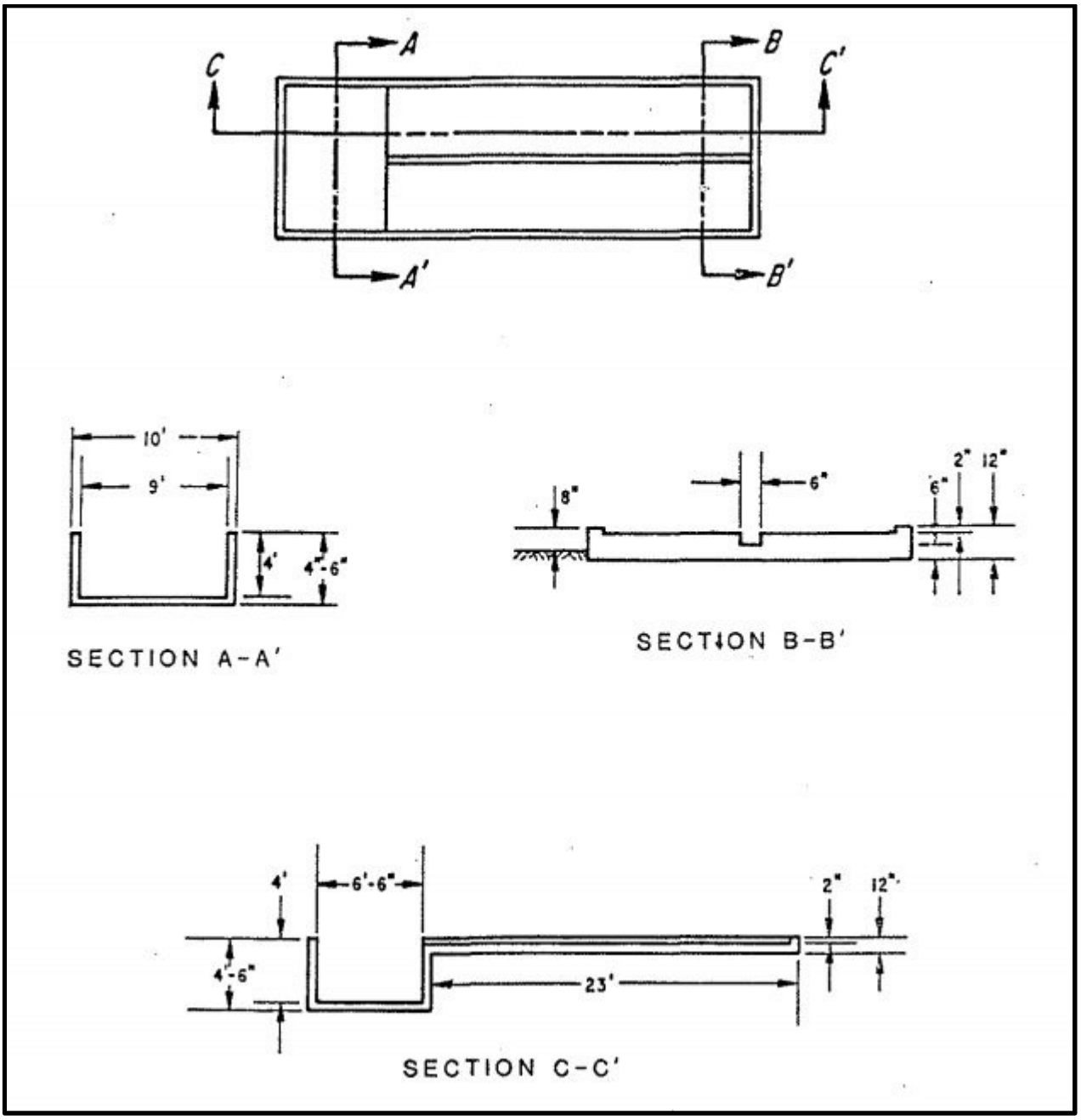

Figure V.B.-4 25-Year 24-Hour Precipitation Map

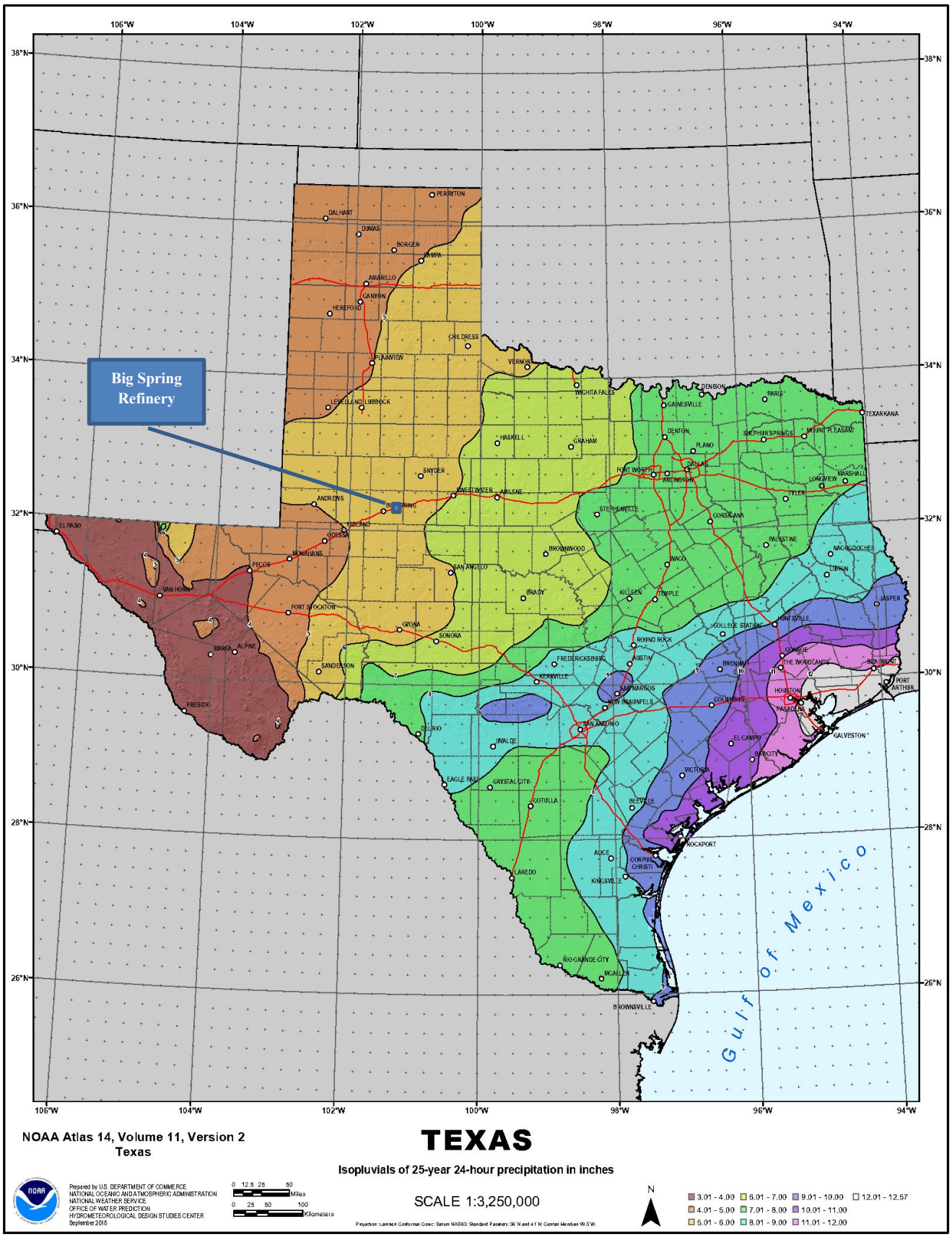

Figure V.B.-5

Container Storage Area Inventory

Date: _____

Drum Identification Number(s):

_____

Date Placed in Container Storage Area:

_____

Description of Contents:

_____

Source:

_____

Type of Material:

_____

Department:

_____

Chemical Name(s):

_____

Flash Point (if applicable):

_____

Transferred to Container Storage:

_____

Date: _____

Signed: _____

Alon USA, LP
Alon USA Big Spring Refinery
Big Spring, TX

Hazardous Waste Permit 50140 - Part B
Application SWR No. 30083 / RN100250869 / CN600881873

SECTION V
APPENDIX V.F.[1]
SITE E LAND TREATMENT UNIT ENGINEERING REPORT

Alon Big Spring Refinery

Compliance Plan CP-50140
Appendix V.F. [1]
Site E Land Treatment Unit Engineering Report
SWR No. 30083 / RN100250869 / CN 600881873

Alon Big Spring Refinery - Big Spring, Texas

April 5, 2024

Kyle Hagen, P.E.
Engineer

Signature

Texas #98869
License Number & State

F-19813
Texas Engineering Firm Registration Number

6/3/2024
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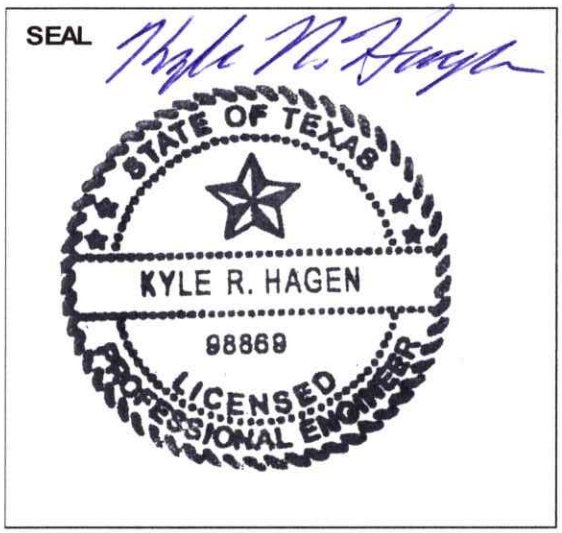

Atlas Technical Consultants, LLC
Texas Registered Engineering Firm F-19813

NOTE: This professional engineer certification is provided to certify the summary, verification of the status, and general ongoing activities at the Site E Land Treatment Unit. This certification is not provided for the engineering design or to certify closure or post closure care of these units.

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Excerpt from RMT, Inc. Appendix V.F., LAND TREATMENT UNITS, April 1998

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Section 1
Site E Land Treatment Unit

The closed Site E Land Treatment Unit (Site E LTU) was in operation from 1976 to November 7, 1988 and was utilized for the disposition of approximately 3,000 tons of hazardous oily wastes. A unique problem concerning this hazardous waste management unit is that it was located above two former surface impoundments (WP-7A and WP-29) that had been historically utilized to treat wastes similar to those that were applied to the Site E LTU. Thus, difficulty arose in determining whether contamination existing below the treatment zone resulted from the Site E LTU or these former impoundments.

Although Fina had demonstrated (to the satisfaction of the TNRCC) that the Site E LTU had not contributed contaminants to the underlying aquifer, the agency decided that detection monitoring for the Site E LTU would not be practicable. As a result, closure commenced for the Site E LTU on December 1, 1988 and a new land treatment unit was designed, constructed, and permitted as a replacement for the Site E LTU. Closure of the Site E LTU was completed in 1995 and certification of closure was approved by the TNRCC in 1996. The Site E LTU has been under post-closure care since that time.

A copy of the original engineering report for the Site E LTU that was submitted to the Texas Department of Water Resources (TDWR), a predecessor agency to the TNRCC, in 1985 as part of the Part B permit application is provided herein (denoted as *Section 7.5 - Land Treatment Unit*). As-built drawings of the closed Site E LTU are provided in Attachment V.F-A.

7.5 LAND TREATMENT UNIT

7.5.1 Description of Land Treatment Unit

7.5.1.1 History

The existing land treatment unit is an irregularly shaped twelve acre plot gently sloping from north to south. Slopes on the site are variable, but the average is 2.5 percent. The surface gradient is greatest in the southwest corner of the site where a slope as steep as 7 to 8 percent exists.

The land treatment unit is located on Fina property, in a relatively remote area. The site is in excess of 800 feet from the nearest Fina property line.

A road along the south and east side of the site provide access for land treatment and monitoring operations. Public access to the site is prevented by fencing at the Fina property lines and by a manned guard station at the entrance to the Fina property.

The soils in the land treatment site tend to be sandy, well drained soils. The soils are of the Springer series. The unsaturated zone extends approximately eighty feet below the site. See Section 8 for a complete soils description.

Based on previous use for waste disposal, Land Treatment Site E can be divided into four general areas (see Figure 7.5-1).

Prior to 1976 Area (1) was landfilled with wastes similar to those now spread and tilled into the treatment zone of the facility.

Area (2) was an old wastewater oil skimming pond which has since been filled with clean soil. The dike on the west side of the pond was cut and oily sludge allowed to flow from the skimming pond into Area (3).

Area (3) was fairly undisturbed prior to the application of wastes. The sludge from the old skimming pond, Area (2), was spread and tilled in this area. An asphalt pit existed at the south end of Area (3). The asphalt was excavated down to clean soil and removed.

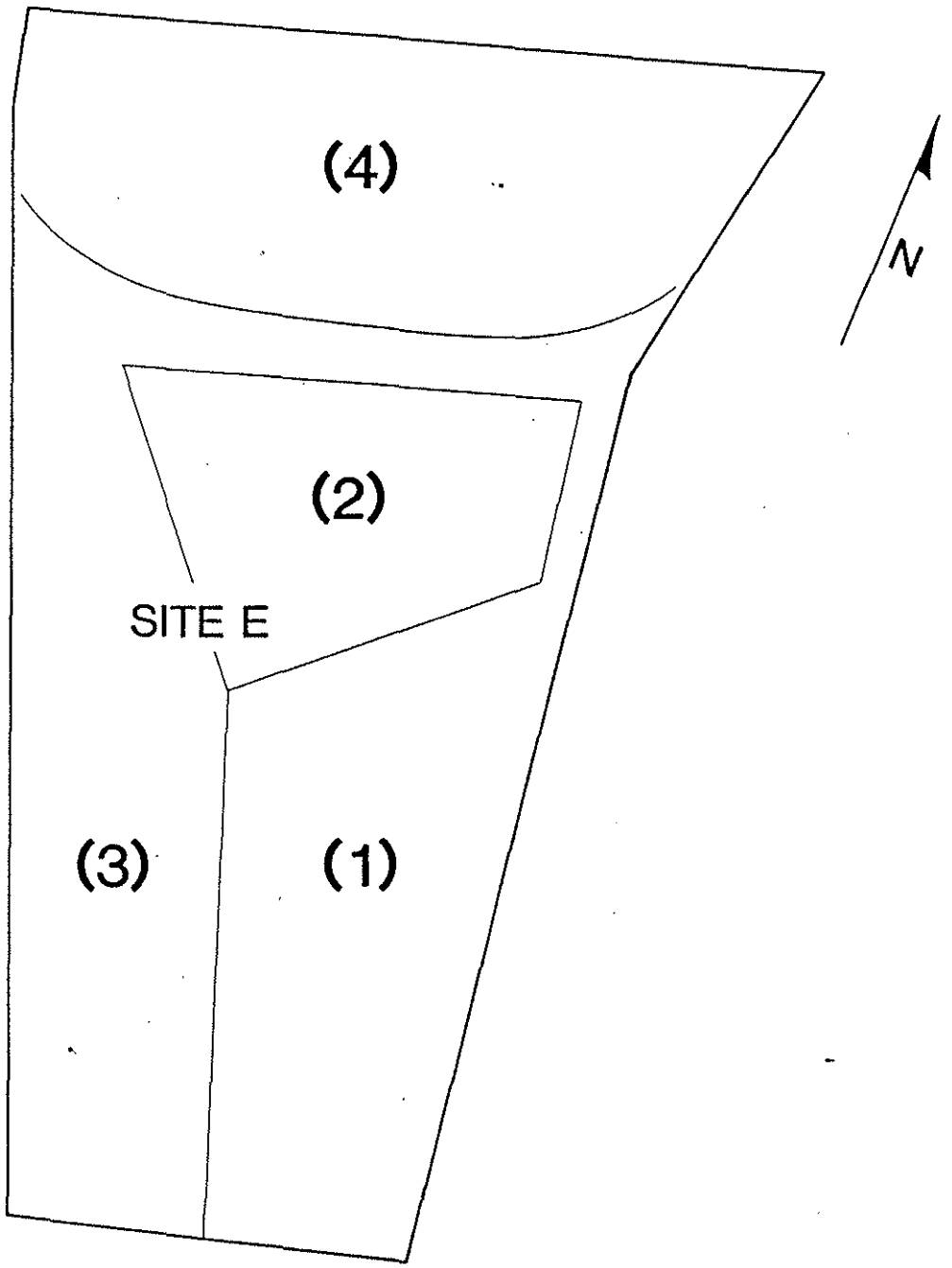
Area (4) was previously part of a waste water equalization storage pond. The pond has been drained, and the area returned to normal grade.

- Treatment Zone

The treatment zone extends to a depth of 1.5 meters. The high water table is estimated to be a minimum of 25 meters below the treatment zone.

- Soils

The soil in the land treatment unit is undulating Springer loamy fine sand. The description of the Springer series and the Springer loamy fine sand follow. The descriptions are direct quotation from "Howard County, Texas, Soil Survey," United States Department of Agriculture, Soil Conservation Service in



COSDEN OIL & CHEMICAL COMPANY
LAND TREATMENT SITE
Williams Brothers Engineering Company

Figure 7.5-1

Cooperation with Texas Agricultural Experiment Station, March 1969.

"Soils of the Springer series are deep, well drained, and sand or loamy. These soils are on uplands and are nearly level to gently sloping. They formed from reddish, calcareous, eolian deposits.

In a typical profile, the surface layer is dark-brown, crumbly, neutral loamy fine sand about 12-inches thick. The subsoil is crumbly fine sandy loam about 36-inches thick. It is reddish brown in the upper part and yellowish red in the lower. The subsoil is underlain by reddish-yellow, mildly alkaline loamy fine sand.

The Springer soils absorb most of the rain that falls. They have moderate to low available water capacity. The hazard of soil blowing and water erosion is high.

Springer soils are farmed to cotton and sorghums and are used as native range.

Profile of a Springer soil that has a loamy fine sand surface layer, 0.8 mile west and 0.2 mile south of the northeast corner of section 2, block A of Bauer and Cockrell Survey; or 0.8 mile north of high from a point 6.5 miles west of Big Spring Post Office; range:

A1 0 to 12 inches, dark-brown (8.5YR 4/4) loamy fine sand, dark brown (7.5YR 3/4) when moist; massive; soft when dry, friable when moist; few, fine roots; noncalcareous; neutral; clear boundary.

B2t 12 to 24 inches, reddish-brown (5YR 4/4) fine sandy loam, dark reddish brown (5YR 3/4) when moist; weak subangular blocky structure; soft when dry, friable when moist; few

fine roots and worm casts; noncalcareous; neutral; gradual boundary.

B3 24 to 48 inches, yellowish-red (5YR 5/6) fine sandy loam, yellowish red (5YR 4/6) when moist; weak subangular blocky structure; soft when dry, very friable when moist; few fine tubes and pores; noncalcareous; mildly alkaline; gradual boundary.

C 18 to 70 inches +, reddish-yellow (5YR 6/6) loamy fine sand, yellowish red (5YR 5/6) when moist, loose when dry, very friable when moist; noncalcareous; mildly alkaline.

The A horizon ranges from 6 to 20 inches in thickness and from fine sandy loam to loamy fine sand in texture. This horizon, when dry, has a hue of 7.5YR or 5YR, value of 4 to 6, and chroma of 2 to 5.

The B2t horizon ranges from 8 to 20 inches in thickness. When dry, this horizon has a hue of 5YR or 2.5YR, value of 4 or 5, and chroma of 4 to 8. The B2t horizon ranges from loam or heavy fine sandy loam to light fine sandy loam.

The B3 horizon ranges from 15 to 30 inches in thickness and from fine sandy loam to light fine sandy loam in texture. When the B3 horizon is dry, its hue is 5YR or 2.5YR, value is 4 or 5, and chroma is 4 to 8. In the lower part, the B3 horizon is calcareous or noncalcareous.

In a few places, mainly areas where the A horizon is fine sandy loam, a weak Cca horizon occurs at a depth of 48 to 65 inches. Depth to the C horizon ranges from 35 to 70 inches.. In some places, a few soft lumps and strongly cemented concretations of calcium carbonate are in this horizon.

Springer soils occur closely with the Amarillo, Brownfield, Gomez, and Tivoli soils. The surface layer of the Springer soils is thinner than that of the Brownfield soils, which consists of fine sand. Beneath the surface layer, the material in the Springer soils is sandier than that in the Amarillo soils and more loamy than that in the Tivoli soils. Springer soils are redder and less limy than the Gomez soils."

"Springer loam fine sand, undulating (Sr).--This undulating soil is in broad upland areas that range from 200 to 350 acres in size. Slopes range from 0 to 3 percent. This soil has a profile similar to the one described for the series, but its subsoil is only 24-inches thick.

Included with this soil in mapping were areas of Tivoli fine sand that occur in stabilized dunes along fence rows and in the more undulating areas. The included areas are less than about 10 acres in size.

This Springer soil is used mainly as range, but a few areas are cultivated. Row crops are not suited, mainly because the surface layer is sandy and highly susceptible to soil blowing. Also, this soil is droughty, for available water capacity is low. Permeability is moderately rapid. (Capability unit VI3-4; Sandyland range site.)"

The Atterburg limits for the soil are as follows:

Liquid Limit	18 to 25
Plastic Limit	11 to 23
Plasticity Index	2 to 7

Spring loamy fine sand contains very little clay. Therefore, the Cation Exchange Capacity is expected to be low.

7.5.2 Run-On Diversion

A berm diverts runoff from the drainage area immediately to the north of the unit. A drainage ditch intersects with the berm at the northeast corner of the land treatment unit. This ditch is complemented with another drainage ditch on the east side of the service road which borders the land treatment unit on the east side. The two drainage ditches conduct any runoff from the drainage areas northeast of the land treatment unit. The majority of runoff northeast of the treatment unit is diverted around the site by the ditch on the east side of the service road. The ditch on the west side of the service road conducts around the site any runoff which may travel down the service road toward the land treatment unit. In addition, this ditch collects and channels around the site any runoff from the land treatment unit which may travel to the east. These run-on diversion patterns are shown on Figure 7.5-2.

As shown on Figure 7.5-2, the drainage areas which produce runoff which must be diverted around the land treatment unit are relatively small and somewhat flat. In determining the adequacy of existing controls to divert runoff from a 100-year, 24-hour storm, the north berm and each ditch were evaluated separately. This evaluation included using a planimeter and Figure 7.1-1 to determine runoff area. Using the Soil Conservation Service method for calculating runoff (Pub. No. 210-18-TX5) and the rainfall information (TP-40), the volume and velocity of runoff was estimated for the 100-year storm. Rainfall information is presented in Figure 7.5-3.

Based on the small drainage area involved, the present berm on the north border is considered more than adequate to divert peak discharge from a 100-year storm.

As for the drainage ditch along the east border, runoff has little tendency to flow from east to west across the service road since the road surface is slightly elevated along the east side of the site.

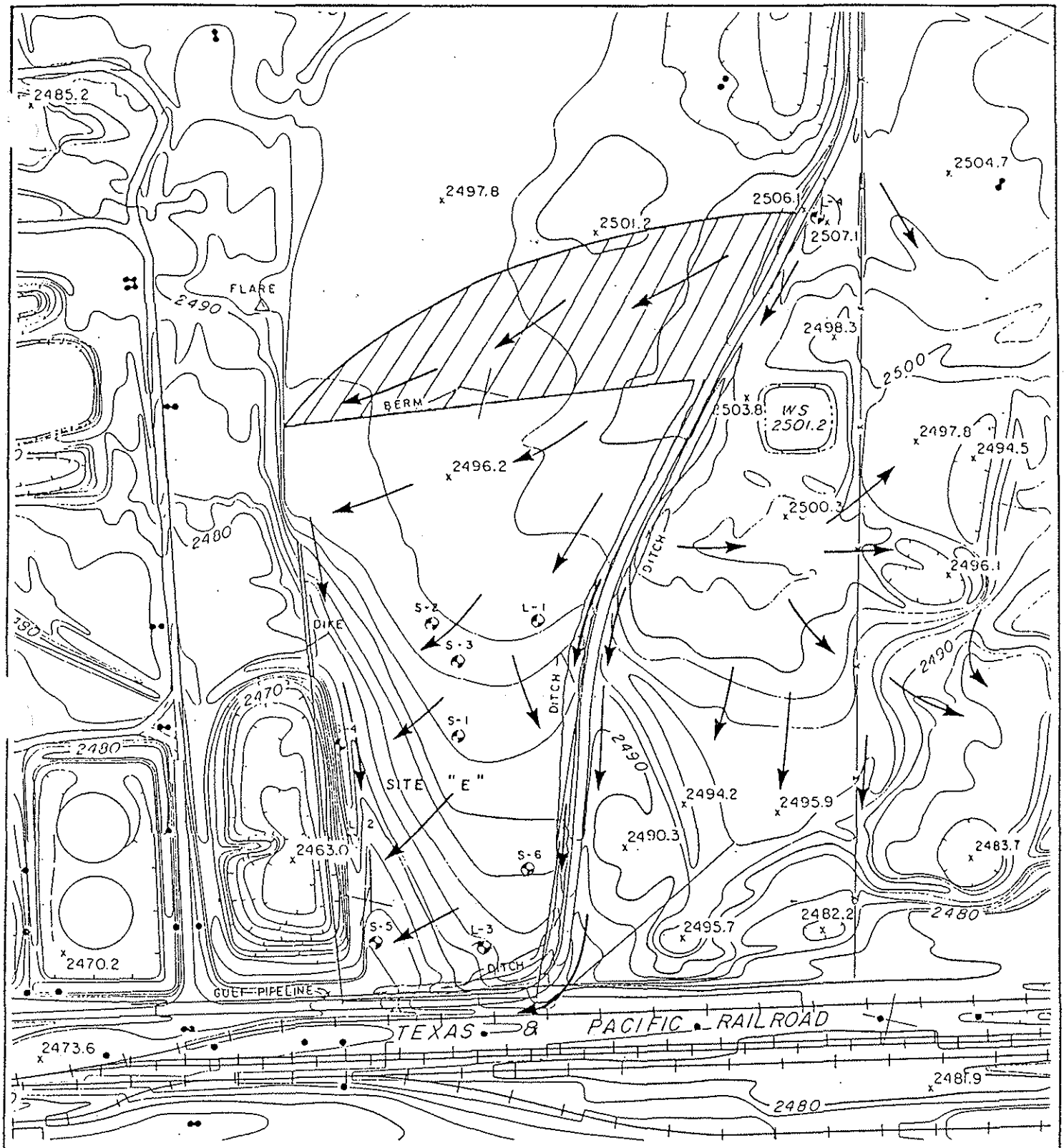
The drainage ditch on the east side of the service road receives runoff from a small area northeast of the land treatment unit. The majority of water in this area flows parallel to the land treatment unit and tends to split about half the length of the land treatment unit with the majority of the flow traveling away from the unit.

7.5.3 Runoff Control

Runoff from the land treatment unit is contained by a soil berm along the west boundary and the drainage ditch along the east and south boundaries. Primary flow of runoff is to the west and southwest and eventually to the southwest corner of the land treatment unit where it leaves the site. A smaller quantity of runoff flows eastward to the run-on diversion ditch at the east side of the site.

All runoff leaving the land treatment unit flows into Fina's stormwater runoff collection system which ultimately flows into the Refinery Lake, WP-6.

The adequacy of the west dike to contain the runoff from the land treatment unit was evaluated much the same as with the run-on diversion. It was determined that a berm 1.5 feet in height would be more than adequate to contain and channel runoff from a 100-year storm toward the southwest corner of the site. There exists a margin of safety in that a small area of the land treatment unit drains into the ditch along the east border of the site.



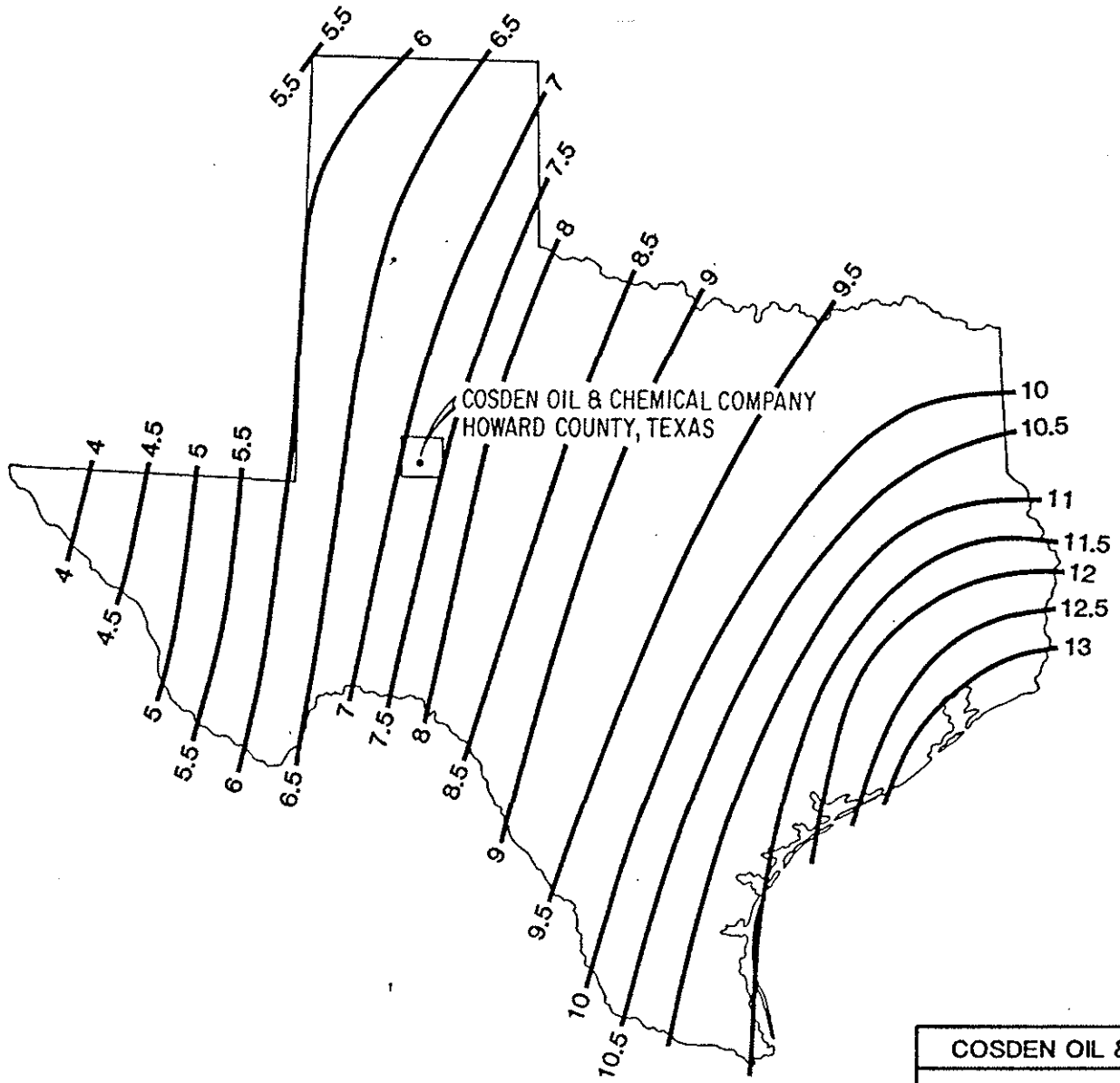
NORTH DRAINAGE AREA

COSDEN OIL & CHEMICAL COMPANY

LAND TREATMENT UNIT
RUN ON CONTROL

Williams Brothers Engineering Company

Figure 7.5-2



COSDEN OIL & CHEMICAL COMPANY
100 – YEAR 24 – HOUR RAINFALL (INCHES)
Williams Brothers Engineering Company

Figure 7.5-3

REF: WEATHER BUREAU NO. TP 40

7.5.4 Wind Dispersal (Site E)

The wastes Fina proposes to apply to the land treatment unit consist of water, solids, and/or hydrocarbons. The solids and/or soil surface, following waste application, mixing and tilling, tend to be water and/or hydrocarbon wet, thus minimizing the possibility of wind dispersal.

Application of contaminated soil from a spill of light hydrocarbons could result in dispersal by volatilization and wind transport in hot weather. Contaminated soil is mixed into the treatment zone as rapidly as possible when soil and atmospheric temperatures are high. With the exception of hydrocarbon contaminated soil resulting from spills, Fina can schedule waste applications to reduce volatile emissions.

7.5.5 Treatment Demonstration

7.5.5.1 Introduction

Land treatment of oily sludges has been practiced in the United States for at least 30 years. The process has been studied seriously for the last 15 to 20 years and it appears to be an economically attractive means of disposing of oily sludges. Land treatment is now gaining as an environmentally acceptable means of treatment and disposal.

Fina Oil and Chemical Company has operated a land treatment unit at the Big Spring, Texas plant since 1976. Presently, the land treatment unit is operated and monitored under interim standards promulgated by the U.S. EPA and the Texas Department of Water Resources.

People in the industry have provided a record of their studies and operating experiences when disposing of oily sludges by land

treatment. In addition, the U.S. EPA has sponsored several studies directed to the development and dissemination of land treatment technology applicable to the disposal of oily sludges generated in the refining and petrochemical industry. Fina proposes to make use of its experience, the experience of the refining and petrochemical industry, the studies developed for and published by the U.S. EPA, and on-site, monitored, field plot studies to develop a land treatment program which will provide for disposal of specific waste materials in an environmentally acceptable manner.

The wastes Fina disposes of by land treatment are typical of wastes generated in the industry and disposed of by available land treatment technology.

Soils, weather patterns, and prior history of the Fina land treatment unit are specific to the unit itself. However, the experience of others is expected to be useful in developing Fina's land treatment unit management and operating plans. Biological degradation of hydrocarbons and many of the toxic materials generally found in refining and petrochemical plant waste is well documented. The degradation rates observed for the hydrocarbons and other materials may vary appreciably depending on land treatment unit management and operating practices, as well as parameters specific to bio-oxidation in soil medium. It is the intent of the proposed treatment demonstration program to develop land treatment management, operational and monitoring procedures that will assure efficient, environmentally acceptable disposal of oily sludges and other specified wastes generated by Fina Oil and Chemical Company.

A description of the proposed land treatment demonstration is provided in the following discussions. The demonstration program includes Fina's experience, the experience of others in the same

industry, the studies sponsored by the EPA, and proposed field plot studies by Fina.

7.5.5.2 Fina's Experience in Land Treatment of Oily Sludge

Hazardous and non-hazardous wastes that Fina has applied to their land treatment unit (LTU) during 1982, 1983, and 1984 are listed in Table 7.5-1. The wastes include contaminated soils resulting from hydrocarbon spills, water treatment sludge, vacuum filter cake, and sludges from the bottoms of waste ponds WP-2 and WP-3. Typical analyses for the wastes, except contaminated soil are shown in Section 5.

Examination of the list of wastes suggests that a large proportion of the waste is applied to the LTU during a relatively short time span. For instance, all the sludge removed while cleaning a pond is applied to the LTU during the brief time required to clean the pond. Oil contaminated dirt is applied during the short time span required for clean up. However, the total quantity indicated in Table 7.5-1 may represent the soil from more than one spill. Vacuum filter cake is produced on a regular basis, and is, therefore, applied to the LTU in small amounts at regular intervals.

The available information suggests that hydrocarbon loading on the LTU has been light during 1982, 1983, and 1984. If the zone of incorporation is taken as the top 8 inches of soil, there are about 2.6 million pounds of soil per acre in the zone of incorporation. It is unlikely that sludge from WP-2 or 3 contains more than 10 percent hydrocarbon or that vacuum filter cake contains more than 50 percent hydrocarbon. The hydrocarbon content of contaminated dirt is taken as 20 percent. On that basis, the hydrocarbon loading on the land farm in 1983 and 1984 was less than 6 percent by weight. During 1982, the hydrocarbon loading may have been as much as 8 percent by weight.

TABLE 7.5-1

WASTES APPLIED TO LAND TREATMENT UNIT
1984

Waste Sequence Number	EPA Code	Class	Code	Volume	Description
010	--	II	248620	2,400,000 lbs.	Wastewater treatment sludge from WP-3
030	--	I	152510	4,000,000 lbs.	Spills and dirt
027	K049	IH	940370	<320,000 lbs.	Filter cake media

WASTES APPLIED TO LAND TREATMENT UNIT
1983

Waste Sequence Number	EPA Code	Class	Code	Volume	Description
030	--	I	152510	4,700,000 lbs.	Spills and dirt
027	K049	IH	940370	<200,000 lbs.	Filter cake media

WASTES APPLIED TO LAND TREATMENT UNIT
1982

Waste Sequence Number	EPA Code	Class	Code	Volume	Description
010	--	II	248620	9,740,000 lbs.	*Wastewater treatment sludge
010		II	248620	11,600,000 lbs.	**Wastewater treatment sludge
026	--	II	240150	18,000 lbs.	Water treatment sludge
027	K049	IH	940370	<73,000 lbs.	Filter cake media

*From WP-3

**From WP-2

Considering the source of the oily wastes applied to the LTU, it is likely that more chromium is applied to the LTU than other metals that could exhibit the characteristic of EP toxicity. Chromium loadings are expected to be about 0.02 percent by weight per year. However, trivalent chromium is very insoluble if the pH is maintained near 8.0 or slightly higher. Therefore, the material should be relatively easy to immobilize.

Fina has used rather rudimentary waste distribution and incorporation procedures. Distribution and incorporation has been accomplished by dumping the waste sludge in relatively small piles at uniform intervals, spreading them further and incorporating the wastes into the LTU surface with a bulldozer. Following distribution and incorporation, the LTU surface is smoothed and disced.

Soil temperatures are adequate for relatively high biological activity during much of the year. Soil temperature measurements made in the Big Spring area during 1983 (4 inch and 8 inch levels) show a minimum reading of 29°F in late December. With the exception of a seven week period during late December and in January, daily minimum soil temperatures are above 40°F and daily maximum temperatures are above 50°F. Soil temperature data for 1983 is shown in Table 7.5-2.

Soil moisture tends to be low, except during periods immediately following precipitation in the Big Spring area. Soil moisture data for the area is shown in Table 7.5-3.

TABLE 7.5-2
*TYPICAL SOIL TEMPERATURE DATA
BIG SPRING, TEXAS
SOIL TEMPERATURE, °F

Week	Average Temperature 8" Depth	Average Temperature 4" Depth	Extreme Temperatures Min.	Extreme Temperatures Max.
12/27/82 - 01/03/84 3	42	42	37	45
01/03/83 - 01/10/83	39	39	36	51
01/10/83 - 01/17/83	45	46	39	55
01/17/83 - 01/24/83	45	46	39	53
01/24/83 - 01/31/83	43	44	37	53
01/31/83 - 02/07/83	43	44	38	50
02/07/83 - 02/14/83	48	49	41	59
02/14/83 - 02/21/83	53	54	45	61
02/21/83 - 02/28/83	53	55	48	65
02/28/83 - 03/07/83	55	58	51	68
03/07/83 - 03/14/83	60	62	52	69
03/14/83 - 03/21/83	59	60	52	70
03/21/83 - 03/28/83	53	60	47	70
03/28/83 - 04/04/83	60	63	54	75
04/04/83 - 04/11/83	56	57	48	71
04/11/83 - 04/18/83	62	64	55	74
04/18/83 - 04/25/83	66	69	60	79
04/25/83 - 05/02/83	72	75	66	85
05/02/83 - 05/09/83	75	77	68	88
05/09/83 - 05/16/83	79	82	74	91
05/16/83 - 05/23/83	78	82	73	91
05/23/83 - 05/30/83	80	83	76	94
05/30/83 - 06/06/83	72	74	60	91
06/06/83 - 06/13/83	80	82	67	94
06/13/83 - 06/20/83	83	85	80	99
06/20/83 - 06/27/83	87	90	83	101
06/27/83 - 07/04/83	86	89	83	101
07/04/83 - 07/11/83	87	90	79	107
07/11/83 - 07/18/83	89	92	86	103
07/18/83 - 07/25/83	89	92	85	102
07/25/83 - 08/01/83	92	94	88	106
08/01/83 - 08/08/83	88	91	80	105
08/08/83 - 08/15/83	87	90	78	104
08/15/83 - 08/22/83	91	93	88	103
08/22/83 - 08/29/83	88	92	84	101
08/29/83 - 09/05/83	91	94	84	103
09/05/83 - 09/12/83	90	92	88	96
09/12/83 - 09/19/83	80	82	72	99

Week	Average Temperature 8" Depth	Average Temperature 4" Depth	Extreme Temperatures Min.	Extreme Temperatures Max.
09/19/83 - 09/26/83	78	82	66	95
09/26/83 - 10/03/83	80	82	77	89
10/03/83 - 10/10/83	80	82	73	91
10/10/83 - 10/17/83	76	78	66	86
10/17/83 - 10/24/83	68	68	57	82
10/24/83 - 10/31/83	63	65	57	79
10/31/83 - 11/07/83	65	66	63	72
11/07/83 - 11/14/83	63	63	53	72
11/14/83 - 11/21/83	60	60	53	67
11/21/83 - 11/28/83	54	54	44	66
11/28/83 - 12/05/83	47	47	42	54
12/05/83 - 12/12/83	47	47	42	56
12/12/83 - 12/19/83	47	47	42	56
12/19/83 - 12/26/83	40	33	29	39

*Source: USDA-ARS Southern Plains Area
Big Spring Field Station
Big Spring, Texas

TABLE 7.5-3
**SOIL MOISTURE DATE (GRAVIMETRIC)

Date	*2.5 cm	*5 cm	*10 cm	*15 cm
5/11/81		5.6	5.2	6.0
5/18/81		5.0	5.8	6.0
5/26/81		3.5	4.1	5.5
6/ 1/81		10.1	8.1	8.2
6/ 8/81		8.9	7.9	8.9
6/15/81		3.7	4.7	5.9
6/22/81		2.8	3.4	4.2
6/29/81		3.1	4.1	5.2
7/ 6/81		4.9	3.0	4.4
7/13/81		2.6	2.9	4.3
7/20/81		2.3	3.3	4.9
7/27/81		2.2	2.9	4.3
8/ 3/81		2.4	2.6	4.5
8/10/81		2.9	3.8	4.3
8/19/81		10.9	8.4	8.4
8/24/81		5.4	3.9	6.4
8/31/81		2.9	3.6	4.6
9/10/81		11.5	8.0	8.2
9/14/81		7.1	6.2	7.7
9/21/81		4.3	4.3	6.0
9/28/81		3.4	3.6	3.5
10/13/81		11.7	6.4	4.3
10/19/81		7.8	8.3	9.0
10/26/81		11.2	8.1	8.8
12/ 9/81		3.3	3.8	5.9
12/18/81		3.4	4.1	5.3
1/ 5/82		3.1	4.5	6.9
1/18/82		7.8	4.6	4.3
2/ 2/82		7.7	4.9	5.2
2/16/82		4.8	4.3	4.5
3/ 2/82		9.6	4.7	5.1
3/15/82	5.0	4.7	4.7	5.1
3/29/82	2.9	3.5	4.7	5.1
4/12/82	2.4	3.2	4.7	5.1
4/27/82	8.1	4.0	4.7	5.1
5/10/82	8.3	7.4	4.7	5.1
5/28/82	13.0	9.7	4.7	5.1
6/ 7/82	3.4	3.8	4.7	5.1
6/21/82	12.5	8.4	4.7	5.1
7/ 6/82	3.6	5.2	4.7	5.1
7/20/82	3.2	4.0	4.7	5.1
8/ 2/82	2.5	2.7	4.7	5.1
8/16/82	2.9	2.9	4.7	5.1
8/30/82	1.9	2.8	4.7	5.1
9/14/82	2.1	2.0	4.7	5.1
9/27/82	3.6	3.2	4.7	5.1

Date	*2.5 cm	*5 cm	*10 cm	*15 cm
10/13/82	5.4	4.8	4.7	5.1
10/25/82	2.8	2.8	4.7	5.1
11/ 8/82	2.7	3.0	4.7	5.1
11/22/82	2.4	2.9	4.7	5.1
12/ 6/82	11.0	8.1	4.7	5.1
12/21/82	9.4	7.1	4.7	5.1
1/ 7/83	14.2	11.0	4.7	5.1
1/17/83	10.1	8.0	4.7	5.1
2/ 8/83	13.1	9.5	4.7	5.1
2/15/83	10.0	7.6	4.7	5.1
2/28/83	7.4	6.8	4.7	5.1
3/14/83	4.2	4.8	4.7	5.1
3/28/83	6.6	4.6	4.7	5.1
4/12/83	3.8	4.2	4.7	5.1
4/25/83	2.4	3.7	4.7	5.1
5/ 9/83	1.7	2.1	4.7	5.1
5/23/83	1.1	2.2	4.7	5.1
6/ 7/83	4.6	4.2	4.7	5.1
6/21/83	2.4	2.9	4.7	5.1
7/ 5/83	2.1	2.7	4.7	5.1
7/18/83	2.8	2.6	4.7	5.1
8/ 2/83	5.5	2.7	4.7	5.1
8/15/83	2.4	2.8	4.7	5.1
8/29/83	3.2	2.5	4.7	5.1
9/19/83	1.9	2.2	4.7	5.1
9/26/83	5.3	6.1	4.7	5.1
10/11/83	3.2	3.6	4.7	5.1
10/24/83	13.3	10.1	4.7	5.1
11/ 8/83	12.0	8.4	4.7	5.1
11/21/83	5.0	4.8	4.7	5.1
12/ 6/83	5.8	5.3	4.7	5.1
				5.1
1/ 4/84	6.5	5.2	4.7	5.1
1/23/84	7.1	5.6	4.7	5.1
1/30/84	5.6	6.0	4.7	5.1
3/16/84	3.4	3.9	4.7	5.1
4/ 9/84	2.4	3.1	4.7	5.1
4/23/84	1.6	2.8	4.7	5.1
5/ 8/84	2.4	2.5	4.7	5.1
5/21/84	6.5	3.3	4.7	5.1
6/ 4/84	7.2	3.4	4.7	5.1
6/18/84	2.8	2.9	4.7	5.1
7/ 2/84	1.6	2.5	4.7	5.1
7/16/84	4.6	2.9	4.7	5.1
7/30/84	2.3	2.5	4.7	5.1
8/14/84	6.5	4.4	4.7	5.1
8/27/84	4.6	4.0	4.7	5.1
9/10/84	1.7	3.2	4.7	5.1
9/24/84	2.7	2.7	4.7	5.1

Date	*2.5 cm	*5 cm	*10 cm	*15 cm
10/ 2/84	9.4	8.5	4.7	5.1
10/16/84	9.7	8.5	4.7	5.1
10/30/84	11.7	8.8	4.7	5.1
11/13/84	4.7	5.0	4.7	5.1
11/26/84	13.6	12.4	4.7	5.1
12/10/84	9.3	8.3	4.7	5.1

*Depth of sample

**Data from Site 21, Agricultural Research Station, Big Spring, Texas

- Monitoring

Monitoring has consisted of inspection, active zone soil sampling, soil core sampling and lysimeter samples of water in the unsaturated zone below the land treatment site.

The land treatment site is inspected intensively before, during, and immediately after waste placement and following rainfall events. Inspection consists of examining the berming and ditching used for "run on" control; inspecting the land surface for erosion and/or evidence of excessive waste concentration in local areas; examining the run-off control berming.

Oily waste loadings in the land treatment site during 1982, 1983, and 1984 were relatively light. Most of the oily material was placed in 1984. Therefore there has not been an urgent need for sampling and analysis. However some sampling was done.

The results of sampling and analysis of soil from the active zone, as well as cores from various depths below the land treatment unit, are shown in Tables 9.7-4, and 9.7-5. The location and depth of samples is shown on Figure 7.1-1 and Table 9.7-6.

The results of analyses made to date indicate that there is no migration of metals in the LTU. The oil and grease content of the soils is not excessively high, the quantities of organic halogens present is low, and soil pH values are satisfactory. The one time any lysimeter samples could be obtained show appreciable amounts of total organic carbon and the conductivity of the water is high. This result can be rationalized in terms of the water balance previously prepared for the LTU site. The water balance calculations indicate that surface water does not penetrate through the unsaturated zone and that leaching of soluble salts is likely to be a slow process since rainfall in

the area is not heavy. (See Paragraph 9.7.1.5 for additional discussion.)

7.5.5.3 Use of Land Treatment in Refining and Petrochemical Industry

The refining and petrochemical industry has been using land treatment for the disposal of oily sludges for more than 30 years. The process has been subjected to serious study for the last 15 to 20 years and rather complete studies have been published in the last 10 years.

Engineers and others active in the industry have published considerable literature relating experience with land treatment. This experience indicates that the hydrocarbons in oily sludges are subject to biodegradation in land treatment operations. The literature indicates the importance of proper mixing, tillage and nutrient addition. It also indicates that the maximum oil content of the soil should be kept below about 12 percent for best results. It suggests that small additions, or loadings, of oil at short time intervals are preferred to large dosages and extended loading intervals.

Physical movement of hydrocarbons through the soil has not been observed. However, there is evidence of some movement of water solubles. The water solubles which have been detected in lysimeter samples may be largely biodegradation products. The biodegradation of hydrocarbons and the toxic materials (phenols, sulfides, cyanide, ammonia, etc.) that sometimes are associated with refinery and petrochemical has been well demonstrated. However, the production and movement of water solubles and biodegradation products is not well understood and certainly has not yet been related to any particular practices in land treating oily wastes.

A publication entitled "Land Treatment of Refinery and Petrochemical Sludges" presents work carried out by K. W. Brown, L. E. Duel, Jr., and J. C. Thomas for the U.S. Environment Protection Agency. This publication provides important information regarding degradation rates of oily sludges and the possible impact of these materials on plants and surface or groundwater quality. This study demonstrates the biodegradability of refinery and petrochemical sludges. It also appears to indicate that land treatment sites must be carefully managed if acceptable to good results are to be obtained in land treatment of oily wastes.

According to Brown, Duel and Thomas, "the water soluble fraction of the sludge possesses the greatest potential for leaching and consequent groundwater contamination". In this connection it should be noted that the water soluble fraction of oily sludges from refineries and petrochemical plants is rather small. Obviously, the oily material that appears as sludge has been in contact with a relatively large volume of water in the refinery sewer system. Complete equilibration of the water soluble fraction between the water and hydrocarbon phases may not occur in the refinery sewer system. Nevertheless, it is unreasonable to think that large amounts of readily water soluble material remains in the hydrocarbon phase.

Bacterial degradation of the water soluble materials appearing in refinery and petrochemical wastewaters has been demonstrated in refinery and petrochemical wastewater treatment plants, as well as in landfarm studies. Experience in wastewater treatment plants demonstrates that toxic materials, including phenol, ammonia, cyanide, sulfide, etc. are readily biodegradable when they are properly managed in the wastewater treatment system. It might be noted that when excessive amounts of insoluble hydrocarbons are allowed to accumulate in the bacterial population of a wastewater treatment plant, the bacteria become

relatively ineffective in biodegrading the water soluble materials present. This observation is, at least qualitatively, consistent with the observation that excessive hydrocarbon loadings on land treatment units result in poor performance of the unit and that small incremental loadings provide higher degradation rates.

It is clear from sludge analyses that highly insoluble hydrocarbons represent the major portion of the organic load applied to a land treatment unit. It is also clear from experience in biological wastewater treatment units and from land treatment unit studies that the insoluble hydrocarbons tend to degrade quite slowly. Since the insoluble hydrocarbons are known to degrade slowly, and since the presence of excessive quantities of hydrocarbons interfere with water and oxygen distribution in the soil, it is reasonable to expect that the insoluble hydrocarbons are both the rate and application limiting constituents in the wastes applied to land treating units at refineries and petrochemical plants. This observation is in qualitative agreement with the conclusion of Streebin, et. al., as presented in their studies of "Land Treatment of Petroleum Refinery Sludges". They conclude that annual loading rates should be "based on projected equilibrium oil concentration not exceeding 12 percent, with an individual application maximum of 4 percent oil."

7.5.5.4 Supplemental Land Treatment Demonstration Studies

The following discussion defines and details activities for supplemental land treatment demonstration activity.

The supplemental land treatment demonstration activities focus on measuring or observing the biodegradability and mobility of hazardous waste constituents and degradation products in simulated operations. Characteristics of the wastes to be

applied and characteristics of the site soils are key elements in supporting biodegradation and waste constituent immobilization within the treatment zone of the site. The key elements include organic constituents, metals, moisture, nutrient content of the waste and the cation exchange capacity, composition, and moisture holding capacity of the site soils. Therefore, both waste and soil characteristics will be measured and observed in the course of this study. Consideration will also be given to overall site conditions and waste management practices.

The only wastes Fina has immediately available for disposal by land treatment are the slop oil recovery solids (vacuum filter cake) and the API separator sludge. Other wastes that Fina plans to dispose of by land treatment occur only infrequently. Sludges from tanks which contained leaded gasoline occur especially infrequently. Fina plans to landfarm those wastes with due attention to both the metals and organic content. However, a long term land treatment demonstration program geared to this waste appears to be impractical considering the frequency of occurrence and the volume of the waste produced.

Fina proposes to demonstrate satisfactory treatment of the major oily waste streams in field plots while operating under interim status standards on the balance of the landfarm area. Wastes that are generated on an intermittent basis will be incorporated into the field plot tests if the waste is generated during the course of the treatment demonstration. The treatment demonstration study will be directed to examining the effect of loading rates, degradation, and leaching when using preselected placement methods and tillage schedules.

- Waste Characterization

The treatment demonstration will start with waste characterization and site evaluation. Samples of soils,

hazardous wastes, and nonhazardous wastes which have not been adequately characterized, will be collected, and analyzed.

Quantitatively, the vacuum filter cake and API separator sludges are the major hazardous waste streams. Soil contaminated with hydrocarbons is also a significant contributor to landfarm loading, but does not occur regularly and is not classified as hazardous, unless the material is flammable. Some tank bottoms are also classified as hazardous but occur very infrequently (once every two to 10 years).

Representative samples of the wastes have been, or will be, collected and analyzed for parameters identified in Table 7.5-4. Nonhazardous wastes applied to the land treatment site will also be included in the study. A representative sample of vacuum filter cake was made from weekly collections of approximately two (2) pounds of waste collected over a period of 4 consecutive weeks. Samples of API separator sludges were collected just before the separators were cleaned. Samples of other materials will be collected as they become available. Five gallons of sample should be sufficient. Leaded tank bottoms (tank sludge and scale) have not been generated since the promulgation of the hazardous waste regulations, thus no information is available for this waste. If this waste is not available through scheduled maintenance, special consideration should be given to obtaining a sample. As with API separator sludge, a five gallon sample volume should be collected. Soil contaminated with product will

TABLE 7.5-4
COMPOSITE WASTE SAMPLE ANALYSES SCHEDULE

	027 Filter Cake	028 API Sludge	022 LPTB*	030 PCS**	010 WWTS Primary	025 Crude Oil Tank Bottoms	023 Product Tank Bottoms	005 Oily Sludge Non-HAZ	024 Tank Bottoms (Not Ignitable)	026 Water Treatment Sludge	031 Spill Clean Up-Flammable	032 Spill Clean Up-Nonignitable
Percent Moisture	x	x	-	x	x	x	x	x	x	-	-	-
Suspended Solids	x	x	x	x	x	x	x	x	x	x	-	-
Ash	x	x	-	x	-	-	-	-	x	-	-	-
Oil and Grease	x	x	-	x	x	x	x	x	x	-	x	x
Total Carbon	x	x	x	x	-	-	-	-	x	-	x	x
Total Sulfur	x	x	-	x	-	-	-	-	x	-	-	-
Total Nitrogen	x	x	-	x	-	-	-	-	x	-	-	-
Metals (semi-quantitative spectrographic)	x	x	x	x	x	x	x	x	x	x	-	-
Skinner List Mass Spec.	x	x	x	x	x	-	-	-	x	-	x	x

*Leaded product tank bottoms.
**Product contaminated soils

likely not be available during the sampling period. If available, approximately 20 to 50 pounds should be collected; otherwise in order to consider this waste, a sample may have to be synthesized. Sampling will be performed using EPA procedures for sampling hazardous wastes where possible. Representative samples have been/will be cataloged and placed in cold storage until the completion of the sampling period. Composite samples of each waste were/will be prepared and submitted to a suitable laboratory for analysis.

- Soils Evaluation

In addition to wastes, samples of site soils will be collected and analyzed. Soil samples (approximately 20 lb. to 40 lb. total) will be collected from the zone of incorporation in the land treatment site (first 8 inches) and at depths indicated in the Soil Sampling Schedule, Table 7.5-5. Composite samples will be made and analyzed for the parameters identified for the Soil Analysis Schedule presented in Table 7.5-6.

When waste characterization and soil analyses are received, the data will be reviewed to identify specific hazardous constituents to be considered in the land treatment demonstration studies and in projecting site capacity. This data will serve a dual purpose. The levels of hazardous constituents in the wastes and soils may indicate potential grounds to pursue waste delistings. Otherwise, the data can be used to narrow the range of constituents requiring treatment demonstration. Total metals content is an essential element in determining the total quantity of wastes that can be applied to the site. Analyses of metal content in the waste plus the projected future waste production and metal content of the soils can be used to determine the remaining site life. The information gained through the waste and soils analyses will be reviewed with respect to management criteria and operating practices.

TABLE 7.5-5
SOIL SAMPLING SCHEDULE

Sample Depth	Number of Samplings*	Samples per Test Plot**	Number of Test Plots	Total Samples
Top 8"	3	2	2	12
2' to 2'-6"	3	2	2	12
5' to 6'	3	2	2	12

TABLE 7.5-6
SOIL ANALYSIS SCHEDULE

	Top 8"	2' to 2'-6"	5'
pH	x	x	x
CEC	x	x	x
Moisture	x	x	x
Extractable Carbon	x	x	x
Total Carbon	x	-	-
Total Nitrogen	x	-	-
Total Phosophorous	x	-	-
Metals (semi-quantitative spectrographic)	x	x	x
Skinner List***	x	x	x

*Selected materials -- based on hazardous materials found in the waste samples. Additional samples will be taken at monthly intervals for oil and grease and pH analysis.

**Composite samples.

***One set of samples taken initially for background. A second set of samples is taken after one year of operation of the test plots.

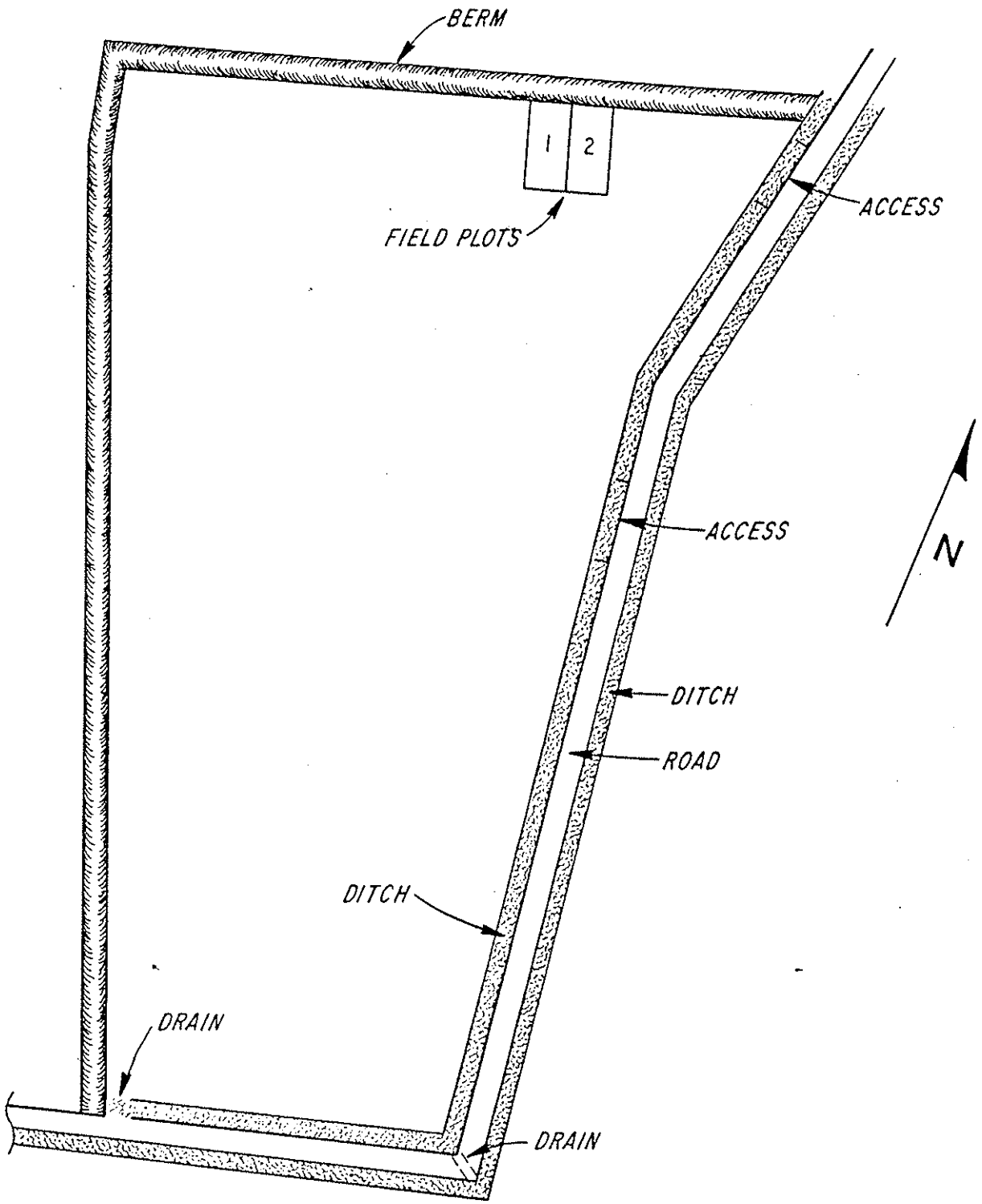
The fate of identified hazardous materials in the wastes will be observed. Therefore, midway in the tests and at the conclusion of the field plot studies, soil samples will be subjected to analysis to determine what changes, if any, occurred in the initial quantities of these materials.

The study will compare hazardous constituents present in soil core samples taken at the conclusion of the study with those of samples taken in the beginning. In addition, samples of any leachate and run-off generated will be analyzed for hazardous constituents found to be present in the waste.

- Field Plot Study - Preliminary Work

Test plot sites in Site E will be selected so that normal operation of the site will not interfere with operation of the test plots. Potential run-on from the active site will be diverted from the test plots. In addition, the test plots will be located to avoid areas of substantial waste loading which have occurred within six (6) months of initiating the study. Boundaries of the test plots will be clearly defined for the duration of the study.

The field plots will be tentatively located as shown on Figure 7.5-4, Land Treatment Unit Plot Plan. The boundaries of the test plots will be marked by placing steel "T" stakes at the corners of the plots. Soil samples will be collected and prepared for analysis. Lysimeter will be installed at the same time the soil samples are taken.



COSDEN OIL & CHEMICAL COMPANY
LAND TREATMENT UNIT PLOT PLAN TENTATIVE FIELD PLOT LOCATIONS
Williams Brothers Engineering Company

Figure 7.5-4

The field plots will be bermed to prevent "run-on" from any other part of the Site E area. A "run-off" sampler will be prepared and installed as shown in Figure 7.5-5.

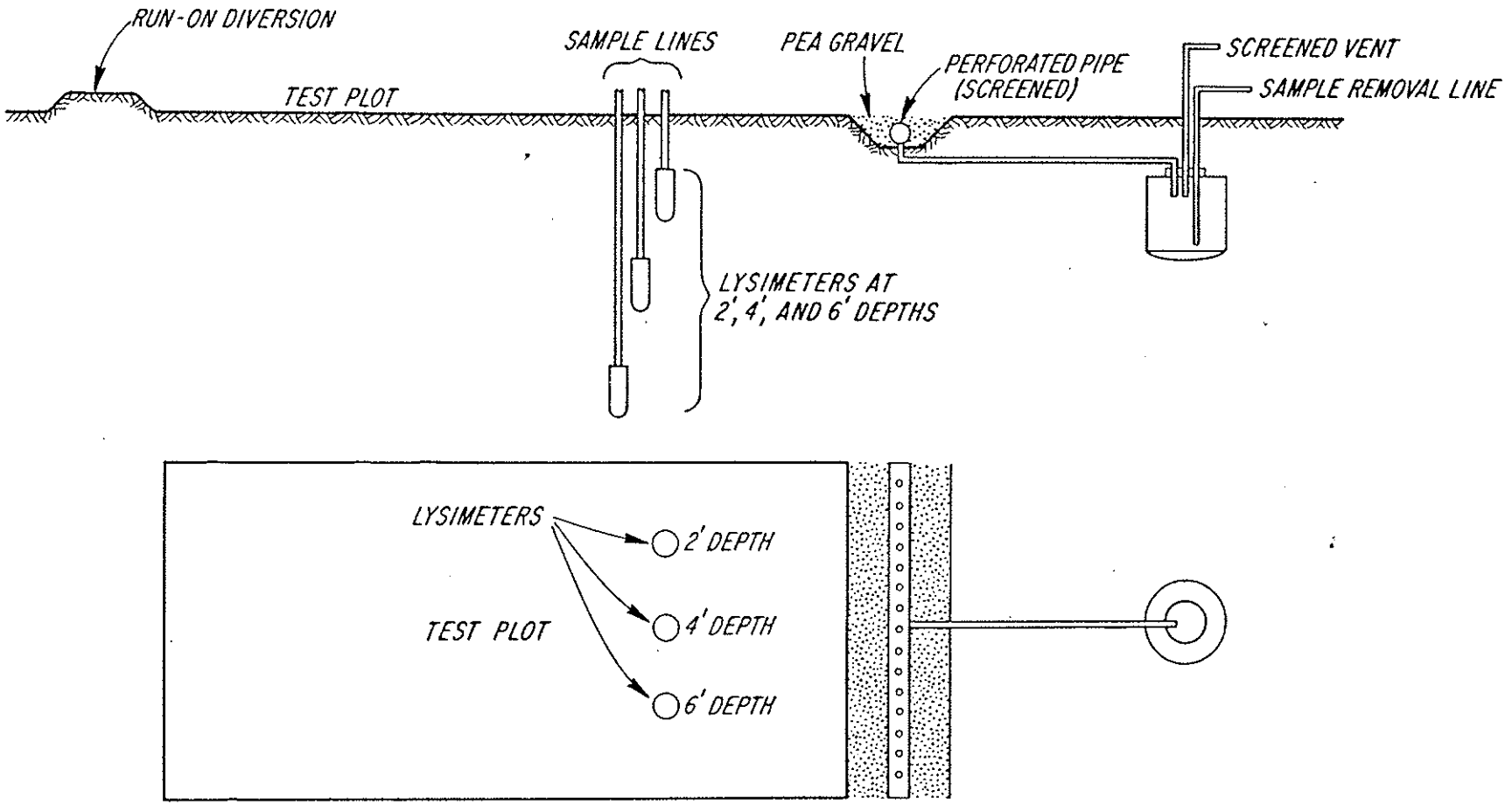
Waste loadings will be calculated based on analyses of the waste sludges proposed for land treatment, the annual hydrocarbon loading rate for the plot and the loading frequency used. Hydrocarbon loadings will be made up from wastes available at the time. Vacuum filter cake and API separator bottoms will be available. Material representing spill cleanup and possibly some tank bottoms can be made available. Measured amounts of the available materials will be transported to and spread on the field plots. The waste application schedule will include all of the wastes Fina proposes to place in the land treatment unit.

Soil and lysimeter sampling and analysis schedules will be reviewed with respect to additional information that may be available when the demonstration work begins. The tilling schedule and final assignment of personnel responsibility will also be made at that time.

The Hazardous Waste Coordinator (HWC) will also interview potential contractors and select a contractor who can furnish equipment and labor for the actual physical placement of waste material and do the necessary tilling as scheduled. All sampling, inspection, and management activity will be handled by Fina personnel under the direction of Williams Brothers Engineering Company (WBEC).

- Field Plot Operations

The wastes which will be placed in the field plots will range from essentially dry solids (vacuum filter cake) to material of a high moisture content. Materials that can be handled as fluids



COSDEN OIL & CHEMICAL COMPANY

TEST PLOT

Williams Brothers Engineering Company

Figure 7.5-5

will be hauled to the plots and placed by dribbling the fluid from a spreader attached to a tank as the tank moves across the plot. The dry solid materials will be placed and spread, so far as possible by distributing small piles uniformly over the surface of the plot. The material will then be distributed mechanically before incorporation in the field plot soil. All of this work will be done by a contractor under the immediate direction and inspection of Fina personnel.

- Rationale for Field Test Plot Demonstration Effort

Fina plans to operate the field test plots in a manner consistent with their anticipated waste occurrence schedule to demonstrate that their land treatment unit can meet Fina's needs for oily waste disposal in an environmentally acceptable manner.

Table 7.5-7 provides estimated quantities of hydrocarbon in the various wastes that Fina plans to place in the land treatment unit. Vacuum filter operations result in relatively uniform rates of waste production. API separator sludges occur when the separators are cleaned. Waste water treatment sludge-primary, from WP-2 and WP-3, occurs when one of these units is cleaned, after sludge accumulation begins to inhibit settling. Crude oil tank bottoms are not normally placed in the land treatment site. However, Fina projects land treating oily waste from crude oil tank bottoms to provide an alternative to oil recovery by a commercial firm dealing in recovery of oil from tank bottoms.

TABLE 7.5-7
ESTIMATED HYDROCARBON IN WASTES
PROPOSED FOR LAND TREATMENT

Sequence Number	Description	Total Estimated Total Quantity lbs/Yr	Probable Hydrocarbon Content %	Estimated Quantity of Hydrocarbon lbs/Yr.
005	Oily sludge	20,000	20	5,000
010	Wastewater treatment sludge-primary	4×10^6	10	400,000
022	Tank bottoms, with lead	1,000	40	400
023	Tank bottoms, petroleum products	300,000	40	120,000
025	Tank bottoms, crude oil	100,000	60	60,000
026	Water treatment sludge	500,000	--	--
027	Filter Cake Media	300,000	25	75,000
028	API separators sludge	50,000	25	12,500
030	Spill cleanup -oil and dirt	1×10^6	10	100,000
031	Spill cleanup of flammable waste	100,000	10	10,000
032	Spill cleanup	1×10^6	10	100,000
	Total	7,371,000		883,000

Product tank bottoms occur irregularly on an as needed basis. They do not constitute a major load on the land treatment unit but obviously present an urgent requirement for disposal when water and oily sludge must be removed from product tanks.

Similarly, except for the fact that they are likely to occur, spills are not readily predictable. However, when a spill occurs there is a very urgent need for possible oily waste disposal. Land treatment appears to be the best means of disposing of such waste material.

Fina operates a 12.09 acre land treatment unit. Based on Fina's experience, and supported by experience and tests reported by others, it is reasonable to expect that Fina's land treatment unit can handle the anticipated hydrocarbon loading. The following observations support successful land treatment unit performance.

(a) Land treatment units can tolerate hydrocarbon concentration up to 10 to 12% in the zone of incorporation. The projected hydrocarbon loading is about 5% (dwb) in the zone of incorporation.

(b) The half life of hydrocarbons in land treatment sites tend to be less than 365 days. There are exceptions. Longer half lives have been noted for petrochemical plant sludges. However, Fina presently has relatively little oily waste derived from petrochemical units since they are not presently in operation.

(c) Land treatment units perform better when the oily wastes are applied in small amounts. Based on Fina's waste occurrence schedule, it is clear that the application of wastes is likely to occur in small

amounts at irregular intervals as opposed to all the waste being placed at one time.

(d) Soil temperatures are favorable for bacterial activity during much of the year.

(e) Tilling schedules can be adjusted for good operation of the land treatment unit. That is, when loadings tend to be heavy, tilling operations can be increased to improve land treatment degradation rates.

(f) Soil conditions tend to be alkaline and the water phase of the Fina waste usually has a relatively high pH. Therefore, low pH conditions are not likely to develop.

(g) Soil moisture in the land treatment site tends to be low which may have an adverse effect on biological degradation rates. However, the average annual rainfall in the area is 18.5" and the rainfall is reasonably distributed through the year. Tilling practices and schedules can be used to help control soil moisture.

Fina feels that two field test plots will be adequate to accomplish a successful land treatment demonstration. The basic difference in operation of the two test plots will be the hydrocarbon loading rate. One of the test plots will be loaded at an annual rate of about 3% hydrocarbon based on the estimated dry weight of the soil in the zone of incorporation. The second plot will be loaded at a 6 percent annual rate. Nutrient addition, tilling, and application schedules will be the same for both plots.

The proposed application rates appear to be relatively low in view of the reported experience of others. However, Fina has no

need to maximize application and degradation rates. Land is available that can be devoted to land treatment if necessary. Should the data obtained from the test plots indicate that the land treatment site loadings must be unexpectedly low, Fina would be able to devote more area to land treatment.

FIELD PLOT ACTIVITY SCHEDULE

Test Plot No	1	2
Loading Rate	*3%	*6%
Loading Frequency	Quarterly	Quarterly
Zone of Incorporation	8"	8"
Tilling Frequency	Monthly	Monthly
Soil Conditioning	As necessary	As necessary

*Dry weight basis in zone of incorporation.

Sampling will be carried out as scheduled. It is expected that some adjustment in the schedule will be both necessary and desirable due to weather and other local conditions.

Based on the area water balance and previous attempts at soil-pore water collection, we anticipate little water, if any, will be collected from lysimeters in the test plots. Therefore, the primary indicators of mobility will be the organic constituents in the soil core samples.

During the twenty-four month period of operation, samples of soil pore-water and run-off will be collected whenever possible. Optimal periods for sample collection will occur after, or possibly during, rainfall events. Samples will be preserved and transported with due attention to sample type, analyses to be performed and chain of custody documentation. Collected samples

will be analyzed for parameters to be determined after the waste and soil characterization is complete. At the conclusion of the study, soil-core samples will be collected and analyzed. A depth profile for hazardous waste constituents will be prepared and results compared to the initial baseline soil cores. Meteorological, soil moisture and soil temperature data for the study period will be obtained from the Big Spring Field Station, Southern Plains Area Cropping Systems Research Laboratory near the site.

Data will be examined and reviewed as it becomes available and modification will be made in the details of the program if such modifications are desirable.

- Develop Land Treatment Site Operations and Management Procedures

Land treatment site operations and management procedures will be developed from the land treatment demonstration activities.

At the conclusion of the treatment demonstration, a list of site management criteria based on accumulated data and test results will be prepared. These criteria will focus on waste application rates and methods, waste application schedule, tillage practices, and waste storage requirements, if any, for continued Site E operations.

7.5.5.5 Project Schedule

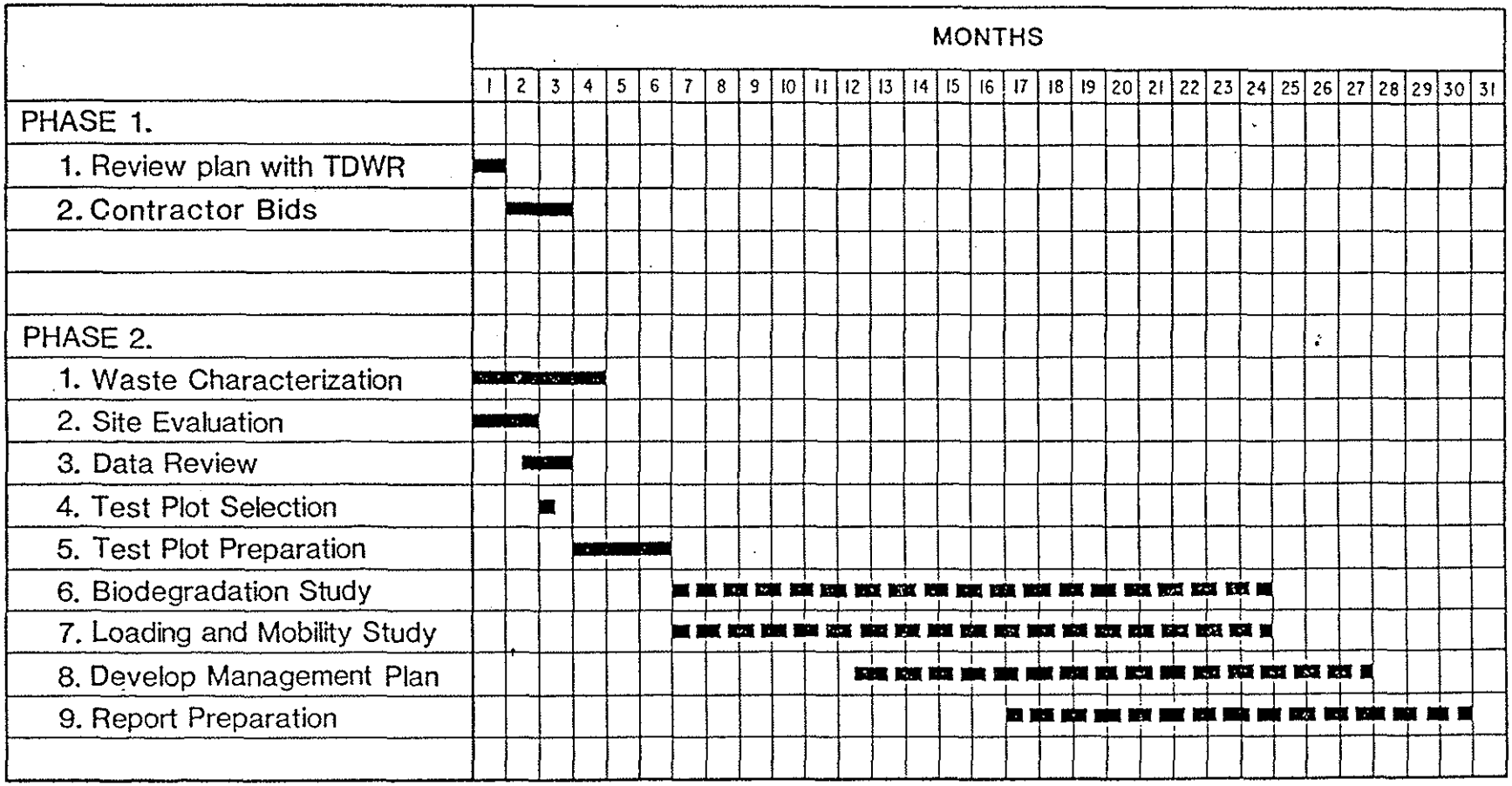
The project schedule covers a period of 30 months (see Figure 7.5-6), including preparatory work and reporting.

7.5.6 Treatment Program

Figure 7.5-6

COSDEN LAND TREATMENT
DEMONSTRATION PROJECT

EXECUTION SCHEDULE



7.5.6.1 Introduction

An effective treatment program should address site layout, site accessibility, water control, erosion control, pH management, soil fertility management, site vegetation, waste storage, air emission control, waste application methods, waste application equipment, site inspection, record keeping, monitoring procedures, contingency plans, emergency equipment, and closure requirements and post closure care.

Most, if not all, of these topics have been addressed during operation of the LTU under interim status standards. However, in some cases, the procedures used need to be strengthened or improved.

Fina is fortunate in that most of the wastes forwarded to the LTU for disposal are not highly toxic, highly reactive, and/or incompatible. While the various wastes should, and in some cases must, be handled with care the contingency plan, monitoring procedures, closure requirements, and post closure care plans can be relatively simple.

Soils contaminated as a result of spilling light hydrocarbons may be flammable and may also result in undesirable air emissions. Some product and crude tank bottoms may also be flammable and have high vapor pressures. Leaded tank bottoms are hazardous and are handled so infrequently that they may present special problems. However, the bulk of the material Fina proposes to dispose of in the land treatment unit are products of the refinery waste water collection and treatment system. With the exception of the contaminated soil and perhaps sludge from leaded tanks, the wastes consist of mixtures of hydrocarbon, solids and water. The hydrocarbon content usually is not high enough to support combustion.

The treatment plan developed attempts to address all the concerns appropriate to economical and effective land treatment of those wastes identified for land treatment disposal. Wastes handled under the plan are expected to undergo detoxification, immobilization, and/or decomposition without injury to the environment, groundwater, or personnel assigned to the work.

7.5.6.2 Site Layout

The land treatment unit location and topography are shown on Figure 7.1-1. Access to the land treatment unit is provided by a service road on the south and east sides of the unit. This road provides access to the proposed land treatment field demonstration sites, and monitoring lysimeters as well as to the operative land treatment site.

7.5.6.3 Water Control

Water control is described in paragraphs 7.5.2 and 7.5.3 of this report. "Run on" is controlled by diking along the north side of the site and by ditching along the east side. "Run off" is controlled by diking along the western boundary, with the southwest corner being the low point. Run off from Site E flows through ditches on the refinery property to the refinery water containment system and ultimately to the refinery lake (WP-6). It does not flow to a stream or natural drainage that might constitute surface water of the State of Texas.

7.5.6.4 Erosion Control

Land treatment unit management practices are directed to reducing erosion. The land treatment unit is "contour tilled," that is tilling is parallel to surface contours. This has the effect of forming small areas for water retention, minimizing run off and

retaining the water for use in the site. In the event that soil washing does occur the soil is largely retained in the diked areas described above. The waste spreading and soil tillage equipment can be used to reshape the site surface as necessary to restore the surface for additional land treatment operation.

7.5.6.5 pH Management

The water phase of the wastes applied to the land treatment area has pH values almost always in the 7 to 11 range. The concentration of alkalinity present in the water phase tends to be small, seldom exceeding 500 ppm. The quantity of alkalinity applied to the land treatment unit with the waste is readily calculable when the waste analysis and the hydrocarbon loading rate is known. It is estimated that the alkalinity that may be placed as part of the waste loading is likely to be the chemical equivalent of 100 to 1,000 lbs. of agricultural lime per acre. It is therefore unlikely that an excessive quantity of alkalinity will be applied to the land treatment area with the oily waste. Supplemental lime addition will probably be required. The pH of the soil will be monitored at yearly intervals. Lime generated from water softening operations and applied to the site as raw water treating sludge and/or supplemental agricultural lime will be placed in the land treatment site as necessary.

7.5.6.6 Fertility

The soil biota needs an adequate supply of nutrients to maintain their activity. Small amounts of phosphorous and nitrogen will be added to the soil with the wastes that are being applied. Similarly materials such as calcium, magnesium, potassium, sodium and trace elements necessary to the well being of the soil biota are present in the refinery waste water and therefore, are present in the water phases of the waste sludges applied to the

land treatment unit. Some of these materials may also be present as solids. Supplemental nitrogen and phosphorous will probably be required. The quantities of supplementary nitrogen and phosphorous required will be estimated based on the amount of carbon applied to the land treatment site as waste material. Supplementary nitrogen will be based on maintaining a nitrogen to carbon ratio of 1:100. Supplementary phosphorous will be based on maintaining a phosphorous to carbon ratio of 1:250. Soil will be monitored annually for nitrogen and phosphorous content.

7.5.6.7 Vegetation

No seeding or tillage program will be directed to promoting vegetative growth, however, volunteer, natural growth of vegetation will be allowed to grow. The hydrocarbon content of the soil will be kept sufficiently low, not to exceed 10 percent by weight, that vegetation is not eliminated by hydrocarbon content and/or soil moisture retention problems.

7.5.6.8 Waste Storage

The land treatment unit will not include any provisions for waste storage. Wastes will be temporarily stored at the point of generation.

7.5.6.9 Waste Application Methods

Wastes will be transported to the land treatment site in vacuum trucks, dump trucks and/or in dumpsters. Wastes will be deposited on a predetermined area of the site and spread as much as can conveniently be accomplished by the transport device. Further spreading and mixing will then be accomplished by means of a bulldozer. After spreading and mixing of the waste and soil is accomplished, the land treatment site surface will be smoothed

and graded. Following smoothing and grading the treated area will be tilled by using a tractor and 18-inch disc harrow. This operation will be conducted to leave any furrows parallel to the land contours.

7.5.6.10 Waste Application Equipment

The equipment needed for spreading and mixing wastes in the land treatment site is obtained by local contract on an as-needed basis. The Contractor is responsible for maintaining the equipment in effective operable condition. Fina's Manager of Environmental Activities is responsible for the technical evaluation of Contractors.

7.5.6.11 Site Inspection

The Hazardous Waste Coordinator will designate a person to inspect the site at least daily during times that waste is being incorporated into the treatment site, at times that repair or maintenance work is being done and/or during and following storm activity. During periods of relative inactivity the site will be inspected at least weekly.

The observations to be made during inspection include: proper distribution and mixing of wastes, condition of dikes, berms, ditches and roads, and the condition of operational safety and emergency equipment. The condition of emergency and safety equipment is especially important as the equipment is used infrequently and it is imperative that it be ready for use in the event of need. (See Section 3 for additional details.)

7.5.6.12 Record Keeping

Record keeping is essential to the successful performance of land treatment activities. Examples of records desired for improved performance evaluation are as follows:

1. Plot layout map

2. Inspections

   a Weekly observations on levees and berms*
   b. Observations of odor, excessive moisture, need for maintenance, etc.*

3. Waste applications

   a. Date
   b. Amount and rate
   c. Location

4. Waste analysis

   a. Original
   b. Quarterly waste analysis reports
   c. Any changes in application rate needed due to change in waste

5. Fertilizer and lime applications*

   a. Date
   b. Amount
   c. Location

6. Monitoring sample analyses

   a. Soil samples
   b. Waste samples
   c. Groundwater samples
   d. Leachage samples
   e. Run off samples*

7. Climatic parameters*

   a. Rainfall
   b. Air temperature
   c. Soil temperature
   d. Soil moisture

8. Accidents

   a. Personal injury
   b. Amount and type of waste spilled
   c. Location

9. Breaches of security

10. Maintenance schedule

   a. Levees and berms
   b. Regrading of plots
   c. Tilling activities
   d. Roads

*Not required by regulation but important to successful management of a land treatment unit.

7.5.6.13 Monitoring

The monitoring program is intended to provide assurance that;

(1) The waste being applied does not deviate significantly from the waste for which the unit was designed;

(2) Waste constituents are not leaching from the land treatment area in unacceptable concentrations; and

(3) Groundwater is not being adversely affected by the migration of hazardous constituents of the waste(s)

The above objectives of monitoring can be achieved through waste analysis, monitoring the unsaturated zone at the land treatment unit, and monitoring run off water.

Vacuum filter cake is the only hazardous waste going to the land treatment unit on a regularly scheduled basis. Other wastes scheduled for disposal by land treatment occur in batches at irregular intervals. Marley basin sludge, non-hazardous water treatment residue, are applied to the land treatment unit at relatively frequent intervals.

Vacuum filter cake analysis may vary with feed quality. Filtration of slop oil may result in a slightly different quality waste filter cake. Sufficient filter cake analyses will be made to establish the important characteristics of these filter cake wastes.

Other wastes that Fina plans to apply to the land treatment unit occur irregularly. However, except in the case of spills the occurrence of the waste as well as sampling and analysis can be scheduled. In all cases these wastes are produced in batches.

Sampling schedules will depend on the size of the batch. Analysis of a single grab sample will be used to characterize small batches. Larger batches will require preparation of a composite sample. Sampling methods used will be appropriate to the type of material being sampled. (See Section 5 for additional details on waste sampling.)

Treatment zone monitoring will be accomplished by sampling the treatment zone and determining the concentration of the rate and capacity limiting constituents. The rate limiting constituent (RLC) is expected to be hydrocarbon. The capacity limiting constituent (CLC) is expected to be a metal, perhaps chromium or lead. The RLC and CLC will be determined in the treatment zone annually. A composite sample will be used.

Soil, and water (if present) samples will be taken from the unsaturated zone at yearly intervals. These samples will be analysed for the RLC and CLC present in the waste. Composite samples will be used.

Storm water from the land treatment unit flows through ditches on Fina property to the refinery lake (WP-6). Samples of run off water will be collected at the land treatment site once annually. Run off sample collection and analysis will be performed the first time run off water is available following waste application.

7.5.6.14 Contingency Plans

Contingency plans are presented in Section 4.

7.5.6.15 Soil Overloads

Soil overloads can occur when the waste to be land treated contains a surprisingly large amount of oil or other material

that may be rate, application, or capacity limiting. In the event that the soil is overloaded, it will be necessary to expand the loading area in the land treatment site to reduce the application rate to a satisfactory level.

7.5.6.16 Changing Wastes

The quality and quantity of waste applied to the land treatment unit can change depending on the status of available process units in the refinery. The Hazardous Waste Coordinator will be responsible for assessing the impact of changes in the refinery configuration on waste quality and quantity. Additional analyses will be performed to determine the effect if necessary.

7.5.6.17 Waste Application Rate

The waste application rate will be determined based on interpretation of data obtained from operation of field plots in a land treatment demonstration. It is expected that the hydrocarbon content of the waste will be the rate and application limiting constituent. Based on available information from the literature it is expected that the hydrocarbons present in the subject wastes will have a half life of less than 450 days. Also, it is expected that the maximum concentration of hydrocarbon in the soil should be less than 10 percent by weight in the treatment zone. The zone of incorporation is estimated to be 8 inches deep. Using these numbers the maximum amount of hydrocarbon present in the soil of the treatment zone is:

$$43560 \times \frac{8}{12} \times 90 \times 0.10 = 261{,}360 \text{ lbs hydrocarbon/acre}$$

ft^2/acre x treatment zone depth, ft x

weight of soil/ft^3, lbs x fraction of hydrocarbon = lbs hydrocarbon/acre

The annual loading rate is:

$$\frac{(261{,}360)\ (365)}{(2)\quad (450)} = 106{,}000 \text{ lbs hydrocarbon/acre/yr}$$

The land treatment site, on that basis, has a capability of degrading

$$106{,}000\ (12.09) = 1{,}218{,}490 \text{ lbs hydrocarbon/yr}$$

In the event that some other constituent turns out to be rate limiting a similar calculation will be used to determine the degradation capability of the land treatment site.

The total capacity of the land treatment site will be calculated from a simple material balance based on the capability of the treatment zone to immobilize the constituent that is determined to be capacity limiting.

7.5.6.18 Closure and Post Closure Care

See Section 10.

Alon USA, LP
Alon USA Big Spring Refinery
Big Spring, TX

Hazardous Waste Permit 50140 - Part B
Application SWR No. 30083 / RN100250869 / CN600881783

SECTION V
APPENDIX V.F.[2]
SITE H LAND TREATMENT UNIT ENGINEERING REPORT

Alon Big Spring Refinery

Compliance Plan CP-50140
Appendix V.F. [2]
Site H Land Treatment Unit Engineering Report
SWR No. 30083 / RN100250869 / CN 600881873

Alon Big Spring Refinery - Big Spring, Texas

April 5, 2024

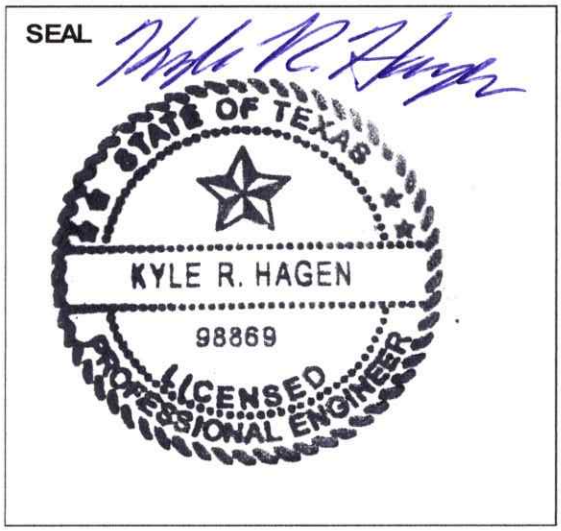
Kyle Hagen, P.E.
Engineer

Signature

Texas #98869
License Number & State

F-19813
Texas Engineering Firm Registration Number

6/3/2024
Date



Atlas Technical Consultants, LLC
Texas Registered Engineering Firm F-19813

NOTE: This professional engineer certification is provided to certify the summary, verification of the status, and general ongoing activities at the Site H Land Treatment Unit. This certification is not provided for the engineering design or to certify closure or post closure care of these units.

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Section 2
Site H Land Treatment Unit

The inactive Site H Land Treatment Unit (Site H LTU) received hazardous waste from 1989 until December 19, 1994 and was utilized for the disposition of approximately 2,000 tons of hazardous wastes. The Site H LTU was constructed in conformance with the Minimum Technology Requirements (MTRs) as established by the EPA for landfills and surface impoundments. The Site H LTU was backfilled with a mixture of native soils and imported clay to produce a land treatment zone (LTZ) that effectively supported processes that could degrade, transform, or immobilize the hazardous constituents in the wastes applied to the active areas of the unit. A stormwater collection/retention pond was constructed for the Site H LTU for the management of stormwater runoff, while a run-on diversion drainage system was provided by compacted clay dikes and graded surface drainage channels. The Site H LTU began receiving hazardous waste in 1992, but the unit is currently inactive and has not received wastes since December 19, 1994 (effective date of land-disposal restrictions for all hazardous wastes). As Fina formally withdrew its petition for a no-migration variance from the EPA in July 1997 (thereby eliminating the possible future use of the unit for the application of hazardous wastes), closure of the Site H LTU is pending.

A copy of the original engineering report for the Site H LTU that was submitted to the Texas Water Commission (TWC), a predecessor agency to the TNRCC, in May 1988 as part of the Part B permit amendment application is provided herein (denoted as *Section 7.7 - Land Treatment Unit (Site H)*). A plan view drawing of the inactive Site H LTU is provided in Attachment V.F-B.

7.7 Land Treatment Unit (Site H)

7.7.1 Description of Land Treatment Unit

7.7.1.1 Background Information and Site Location

The unique feature of the Site H LTU that distinguishes it from conventional land treatment units is that it will be constructed with a primary 60-mil HDPE membrane liner with a synthetic geonet leachate collection system, a secondary HDPE membrane liner with a synthetic geonet leachate collection system, and a compacted clay liner of three-foot thickness. The land treatment zone will consist of soils with suitable physical and chemical properties for effective land treatment of hazardous wastes. All phases of design and construction will be in accordance with appropriate design criteria from the Minimum Technology Guidance on Double Liner Systems for Landfills and Surface Impoundments - Design, Construction, and Operations (EPA/530-SW-85-014). Guidance documents concerning design and construction of liner systems for land treatment units are not presently available.

The objective is to design a unit with a liner system capable of preventing liquid movement from the unit to the ground water and to meet the minimum technology requirements (MTR) design criteria for providing a secondary liner system with a leak detection system capable of detecting a leak in the primary liner. This liner system should also provide secondary containment for the primary liner to prevent escape of liquids from the unit. Although the operation of an LTU is distinct from the operation of a landfill or surface impoundment, applicable MTR guidance will be applied in order to ensure that the LTU will be constructed with design features necessary to provide a high degree of certainty that there will be no migration of hazardous constituents from the unit for as long as the waste remains hazardous.

The LTU will be sited on a rectangular-shaped plot approximately 4000 feet north of the existing land treatment unit (Site E). This location was selected from a 30-acre tract of land in the northern portion of the Fina facility which is outside the upgradient limit of known ground-water contamination. The southeast corner of this tract was chosen as the location of the LTU due to its proximity to a set of existing cluster monitoring wells (MW-34/34A) which can serve as downgradient monitoring wells for the LTU. The location will also minimize the amount of piping necessary to convey stormwater runoff and leachate collection system underflow to the wastewater treatment system headworks.

The design size for the active area of the LTU is 5.0 acres. This area requirement is based on estimates of volumes of hazardous wastes listed in Table 7.7-1 which have to be land treated. The calculations used to derive an area of five acres were performed based on data presented in Land Treatment Practices in the Petroleum Industry (API 1983).

Although considerable variation exists in the documented data, an average oil loading rate of 470 bbl/acre/yr is reported for an example facility at which operating conditions closely resemble those at Fina in regards to waste types, soil characteristics, and climate. A statistical analysis of the data reported for all the example facilities (normalized for ZOI depth and degradation months) revealed this oil loading rate to be a good representative value.

The weight percent of oil in the ZOI resulting from a one-time oil loading of 470 bbl/acre/yr would compute to be 6.4%, but based on the annual oil degradation rates suggested in the API publication, the annual weight percent of oil in the ZOI would not exceed 4% during the initial four years of LTU operation. This 4%, not a design criteria, was determined as a result of the analysis of proposed LTU operations at the 5-acre site utilizing the oil loading rate of 470 bbl/acre/yr. The calculations upon which these conclusions are based are presented in Table 7.7-2.

TABLE 7.7-1
ESTIMATES OF FUTURE VOLUMES OF HAZARDOUS WASTE TO BE DISPOSED ON LTU

Waste No.	(TWC)	Waste Description	Annual Tons Disposed	% Oil	Annual Oil Loading(tons)
022	(950220)	Leaded Tank Bottoms	20	2	0.40
023	(952940)	Ignitable Tank Bottoms	75	25	18.75
027	(940370)	Filter Cake Media	1564*	20	312.85
028	(950050)	API Separator Sludge			
031	(915260)	Spill Cleanup-Flammables	750	5	37.50
056	(979090)	Spent Treating Clay	10	5	0.50

			Annual Total		370.00

*Annual tons disposed calculated from 3000 lbs/day of solids from wastewater treatment system consisting of dewatered sludge with 35% solids and 20% oil content. This figure represents the volumes of wastes 027 and 028.

TABLE 7.7-2
CALCULATIONS USED TO DERIVE AREAL EXTENT OF LTU

Assumptions

Oil Loading Rate = 470 bbl/acre/year
Depth of ZOI = 8 inches
Weight Percent Oil in ZOI Not to Exceed 4%
Annual Oil Degradation Rates As Follows:

1st Year - 60%
2nd Year - 70%
3rd Year - 80%
4th Year - 85%

Density of Oil = 0.1575 tons/bbl (API 1983)
Density of Soil = 80 lbs/ft^3 (API 1983)
Tons of Waste Disposed = per Table 7.7-1

Calculations (Let z = tons of oil, y = acres of LTU)

$$\text{Volume of soil in ZOI} = 43560 \frac{ft^2 \text{ ZOI}}{\text{ac LTU}} \times 0.667 \text{ ft ZOI}$$

$$= 29040 \frac{ft^3 \text{ ZOI}}{\text{ac LTU}}$$

$$\text{Pounds oil per acre of LTU} = \frac{z}{y} \frac{\text{tons oil}}{\text{ac LTU}} \times 2000 \frac{\text{lbs}}{\text{tons}}$$

$$= \frac{2000z}{y} \frac{\text{lbs oil}}{\text{ac LTU}}$$

$$\text{Pounds oil per } ft^3 \text{ of ZOI} = \frac{2000z}{y} \frac{\text{lbs oil}}{\text{ac LTU}} \times \frac{1 \text{ ac LTU}}{29040 ft^3 \text{ ZOI}}$$

$$= \frac{0.06887z}{y} \frac{\text{lbs oil}}{ft^3 \text{ ZOI}}$$

$$\text{Weight \% oil in ZOI} = \frac{0.06887z}{y} \frac{\text{lbs oil}}{\text{ft ZOI}} \times \frac{1 ft^3 \text{ ZOI}}{80 \text{ lbs ZOI}} \times 100$$

$$= \frac{0.08609z}{y} \%$$

$$\text{Acres of LTU} = \frac{\text{annual volume of oil disposed, bbl/year}}{\text{annual loading rate, bbl/acre/year}}$$

TABLE 7.7-2
(continued)

Conclusions

$$\text{Acres of LTU} = \frac{370 \text{ tons oil}}{\text{yr}} \times \frac{1 \text{ bbl oil}}{0.1575 \text{ tons oil}} / \frac{470 \text{ bbl}}{\text{acre-yr}}$$

$$= 5.0 \text{ acres}$$

$$\text{Annual weight \% oil in ZOI} = \frac{0.08609\ z}{5.0 \text{ acres}} = 0.01722z \%$$

Year	Cumulative Oil Applied (tons)	Assumed Annual % Oil Degraded	Tons Oil Remaining	% Oil in ZOI
1	370	60	148	2.54
2	740	70	222	3.82
3	1110	80	222	3.82
4	1480	85	222	3.82

Construction of the entire unit, including berms and buffer zones, will require a total area of nearly 10.3 acres (590' by 760') which will encompass an active LTU area of waste application of 5.0 acres (390' by 560'). Existing slopes at the site are variable, but the general topographic gradient averages about 1-2% from northeast to southwest. The constructed grade of the LTU will be leveled through balanced cuts and fills to maintain this approximate NE to SW slope. The base of the excavation of in situ soils will also be finished to this slope. Final contours at the site will be established to provide adequate drainage of rainfall runoff from the interior surface area of the LTU.

A road along the northern fence line will be extended to the east and then to the north to provide access to the southern and eastern sides of the LTU. Access to the site will be controlled by the installation of additional fencing and locking gates.

7.7.1.2 Excavation of In Situ Soils

The LTU will be constructed so that the prepared surface of the interior area will be at the level of the existing grade of the site area. This will require the excavation of the in situ soils to a depth of about nine feet over the entire interior area of the LTU. The soils will be stockpiled at the site and will be utilized in a proportionate mixture with imported clay for backfilling of the land treatment zone (LTZ). Excess soils from the excavated soils stockpile will be used as needed on various areas around the LTU where common fill will be required during grade and fill operations.

7.7.1.3 Compacted Clay Liner

According to the minimum technology requirements established by the EPA for double-lined landfills, a minimum three-foot compacted clay liner (prepared in six-inch lifts and compacted to a hydraulic conductivity no greater than 1×10^{-7} cm/sec) shall be provided as the lowermost barrier of a composite liner (i.e., a liner consisting of an upper flexible membrane liner overlying a compacted clay liner) in order to provide assurance against the migration of any hazardous constituent from the LTU into the unsaturated zone below the unit. Imported clay from a Mitchell County quarry will be utilized to construct this soil liner over the entire base of excavation and along the side slopes. Preliminary soils testing has been conducted on a sample of the imported clay, yielding the following results:

- Permeability: 8.05×10^{-9} cm/sec
- Percent Passing No. 200 Sieve: 80.1
- Liquid Limit: 49
- Plasticity Index: 23

The soil liner will provide a stable base upon which the remaining components of the LTU will be constructed. The top surface of the compacted clay liner will be graded to produce V-shaped troughs oriented along the length of the LTU with 2% minimum cross-gradient slopes to facilitate leachate drainage to and collection from a number of individual leachate collection cells. A cross-section view drawing of the LTU showing the slopes is included in Sheet 8 of the engineering plans. The clay liner will provide a barrier capable of retarding the migration of hazardous constituents below the treatment zone should failure of the double flexible membrane liner system occur.

7.7.1.4 Secondary HDPE Membrane Liner

A 60-mil HDPE liner will be installed on the surface of the compacted clay liner and will provide secondary containment to prevent the migration of liquids to the compacted clay liner below the LTZ. This secondary liner will effectively isolate the entire interior LTU area from the underlying native soils, and in conjunction with the compacted clay liner, will serve to provide reasonable assurance that hazardous constituents will not migrate from the unit.

7.7.1.5 Secondary Leachate Collection System

Any liquid that may leak through a rupture or tear in the primary HDPE liner will be detected with a secondary leachate collection system composed of an HDPE drainage net material overlying the secondary HDPE liner. A minimum of four leachate collection cells oriented along the length of the LTU will be utilized to transport underflow to individual collection points in the event of a failure of the primary liner.

The secondary leachate collection system will be designed to collect liquid underflow in a gravity drainage system. This system will gravity drain to a sump located inside of the LTU containment dikes. The sump will provide an access point allowing the secondary leachate collection system to be inspected for liquids. Liquid collecting in the secondary system would provide an indication that the primary HDPE membrane liner was leaking.

Design calculations that illustrate the capability of the secondary leachate collection system to drain the volume of leachate generated by the 100-year, 24-hour rainfall event are presented in Table 7.7-3. These calculations include determinations of (1) maximum head above the flexible membrane liner, (2) flow capacity of the synthetic drainage net, and (3) flow of leachate out of the system through the 2" polyethylene drainage pipes. As indicated by the calculations, the secondary system will be capable of removing the volume of liquid at a rate faster

TABLE 7.7-3
DESIGN CALCULATIONS FOR SECONDARY LCS FOR LTU

Maximum Head

The maximum head acting on the flexible membrane liner (FML) below the secondary leachate collection system drainage net should not exceed one foot (MTR) and is given by the following:

$$H_{max} = \frac{(L)*c^{0.5}}{2} \{ \frac{\tan^2 a}{c} + 1 - \frac{\tan a}{c} [(\tan^2 a + c)^{0.5}] \} \quad (1)$$

where:

H_{max} = maximum head acting on FML (ft)

L = spacing of drainage pipes (ft)
a = angle of slope of drainage net (degrees)
q = leachate impingement rate through primary liner (cm/sec)
k = hydraulic conductivity of drainage net (cm/sec)
c = q/k

For the Secondary LCS:

L = 100 ft
a = 1.146 degrees (for 2% slope)
q = 1.4E-05 cm/sec (2)
k = 50 cm/sec (3)
c = q/k = 2.8E-07

Thus: $\frac{(L)*c^{0.5}}{2} = \frac{100 * (2.8E-07)^{0.5}}{2} = 0.0265$

$$\frac{\tan^2 a}{c} = \frac{\tan^2(1.146)}{(2.8E-07)} = 1428.6$$

$$\frac{\tan a}{c} [\tan^2 a + c]^{0.5} = \frac{\tan(1.146)}{(2.8E-07)} [\tan^2(1.146) + (2.8E-07)]^{0.5}$$

$$= 1429.1$$

Hence: $H_{max} = 0.0265[1428.6 + 1 - 1429.1] = 0.01325$ ft

= **0.159 in** < 0.2 in net thickness < MTR of 1 ft

TABLE 7.7-3 (CONT.)
DESIGN CALCULATIONS FOR SECONDARY LCS FOR LTU

Drainage Net Flow

From Darcy's Law, the flow rate through porous media is given by:

$$Q = k\ i\ A$$

where: Q = flow rate (cfs)
k = hydraulic conductivity of drainage net (fps)
i = hydraulic gradient = h/L (ft/ft)
A = cross-sectional area of flow, LxT (sf)

For the drainage net: k = 50 cm/sec = 1.64 fps
i = 1 ft/50 ft = 0.02
A = (400 ft)(0.2/12 ft) = 6.67 sf

Thus: Q = (1.64)(0.02)(6.67) = 0.2188 cfs per side of each LCS cell

Q_{net} = (0.2188 cfs)(4 cells)(2 sides/cell)

= **1.75 cfs**

Since the primary HDPE liner would contain at least 75% of the volume of rainfall (leachate) generated during the 100-year, 24-hour storm over the 6.5-acre interior LTU area unless a total failure of the liner occurred, the flow rate required to drain the secondary LCS net of the remaining 25% of rainfall volume would be:

$$V = \left(\frac{1.18 \text{ ft of rain}}{12}\right)(6.5 \text{ acres})(43{,}560 \text{ sf/acre})(0.25) \qquad (4)$$

= 6,960 cf of total leachate influx

Q_{100} = (6,960 cf)/[(24 hrs)(3600 sec/hr)]

= **0.081 cfs**

Hence: The LCS drainage net material is capable of draining the leachate that would enter the secondary leachate collection system from the 100-year, 24-hour storm at a faster rate than it impinges, or:

$$Q_{net} > Q_{100}$$

TABLE 7.7-3 (CONT.)
DESIGN CALCULATIONS FOR SECONDARY LCS FOR LTU

Pipe System Flow

The flow rate through piping is given by Manning's Equation as:

$$Q = \frac{(1.486)}{n} (A) (R^{0.67}) (S^{0.5})$$

where: Q = flow rate (cfs)
n = Manning's roughness coefficient
A = cross-sectional flow area of pipe (sf)
R = hydraulic radius (ft)
S = hydraulic gradient (ft/ft)

For one 2" pipe: n = 0.01
$A = 3.14(D^2/4) = 0.022$ sf
$R = A/[(3.14(D)] = 0.042$ ft
S = 0.01

Thus: $$Q = \frac{(1.486)}{0.01}(0.022)[(0.042)^{0.67}][(0.01)^{0.5}]$$

$$= 0.039 \text{ cfs}$$

For 4 pipes:

$$Q_{Tot} = \mathbf{0.156 \text{ cfs}}$$

Hence: The 2" polyethylene drainage pipes can effectively drain the volume of liquid from the secondary leachate collection system that results from the 100-year, 24-hour storm, or:

$$Q_{Tot} > Q_{100}$$

(1) Equation taken from Earthen Liners for Land Disposal Facilities by David E. Daniel, M. ASCE. Presented at "Geotechnical Practices For Waste Disposal", ASCE Conference, June, 1987.

(2) Impingement rate of 1.4E-05 cm/sec taken as the low-side hydraulic conductivity of the LTZ soil mixture. It should be noted that this represents the maximum impingement rate that could ever possibly penetrate the primary HDPE liner.

(3) Hydraulic conductivity of 50 cm/sec chosen as a conservative estimate of the k value for TENAX CE 2 or GUNNET XL-4 at a hydraulic gradient of 2%.

(4) Inflow rate taken from: (7.3 inches of total rainfall) - (6.12 inches of runoff) during 24-hour period. See discussion in Subsection 7.7.3.3.

than an assumed maximum 25% impingement rate into the system (in case of a major failure of the primary liner failure) during the 100-year, 24-hour storm. Although the secondary system has the capability to drain this volume of leachate, it should be noted that the intended function of this system will be leak detection.

7.7.1.6 Primary HDPE Membrane Liner

An additional 60-mil HDPE liner will be installed above the secondary leachate collection system and will serve as the primary barrier to the migration of liquids below the LTZ. This primary liner, in conjunction with the secondary HDPE liner, the compacted clay liner, and the leachate collection systems will provide high assurance that hazardous constituents will be prevented from migrating from the LTU.

7.7.1.7 Primary Leachate Collection System

Liquid that migrates through the entire thickness of the treatment zone will be drained from the LTU through the primary leachate collection system. Detailed drawings of the primary leachate collection system are included on Sheet 9 of the engineering plans. This system will also utilize an HDPE drainage net that will overlay the primary HDPE liner. A polypropylene filter fabric will be installed above the HDPE drainage net to protect the primary leachate collection system from being clogged by migrating fine-grained materials from the soils in the overlying LTZ. A minimum of four leachate collection cells oriented along the length of the LTU will be utilized to delineate areas of the LTU in the event of a failure of the LTU (i.e. hazardous constituents discovered in the primary leachate collection system).

Design calculations that illustrate the capability of the primary leachate collection system to drain the volume of leachate generated by the 100-year, 24-hour rainfall event are presented in Table 7.7-4. These calculations include determinations of (1) maximum head above the flexible membrane liner, (2) flow capacity of the synthetic drainage net,

TABLE 7.7-4
DESIGN CALCULATIONS FOR PRIMARY LCS FOR LTU

Maximum Head

The maximum head acting on the flexible membrane liner (FML) below the primary leachate collection system drainage net should not exceed one foot (MTR) and is given by the following:

$$H_{max} = \frac{(L)*c^{0.5}}{2} \{ \frac{\tan^2 a}{c} + 1 - \frac{\tan a}{c} [(\tan^2 a + c)^{0.5}] \} \quad (1)$$

where:

H_{max} = maximum head acting on FML (ft)

L = spacing of drainage pipes (ft)
a = angle of slope of drainage net (degrees)
q = leachate impingement rate through LTZ (cm/sec)
k = hydraulic conductivity of drainage net (cm/sec)
c = q/k

For the Primary LCS:

L = 100 ft
a = 1.146 degrees (for 2% slope)
q = 1.4E-05 cm/sec (2)
k = 50 cm/sec (3)
c = q/k = 2.8E-07

Thus: $\frac{(L)*c^{0.5}}{2} = \frac{100 * (2.8E\text{-}07)^{0.5}}{2} = 0.0265$

$$\frac{\tan^2 a}{c} = \frac{\tan^2(1.146)}{(2.8E\text{-}07)} = 1428.6$$

$$\frac{\tan a}{c} [\tan^2 a + c]^{0.5} = \frac{\tan(1.146)}{(2.8E\text{-}07)} [\tan^2(1.146) + (2.8E\text{-}07)]^{0.5}$$

$$= 1429.1$$

Hence: $H_{max} = 0.0265[1428.6 + 1 - 1429.1] = 0.01325$ ft

= **0.159 in** < 0.2 in net thickness < MTR of 1 ft

Drainage Net Flow

From Darcy's Law, the flow rate through porous media is given by:

$$Q = k\ i\ A$$

where: Q = flow rate (cfs)
k = hydraulic conductivity of drainage net (fps)
i = hydraulic gradient = dH/L (ft/ft)
A = cross-sectional area of flow, LxT (sf)

For the drainage net: k = 50 cm/sec = 1.64 fps
i = 1 ft/50 ft = 0.02
A = (400 ft)(0.2/12 ft) = 6.67 sf

Thus: Q = (1.64)(0.02)(6.67) = 0.2188 cfs per side of each LCS cell

Q_{net} = (0.2188 cfs)(4 cells)(2 sides/cell)

= **1.75 cfs**

The flow rate required to drain the primary LCS net of the volume of rainfall (leachate) generated during the 100-year, 24-hour storm over the 6.5-acre interior LTU area would be:

$$V = \left(\frac{1.18}{12}\text{ ft of rain}\right)(6.5\text{ acres})(43{,}560\text{ sf/acre}) \quad (4)$$

= 27,840 cf of total leachate influx

Q_{100} = (27,840 cf)/[(24 hrs)(3600 sec/hr)]

= **0.322 cfs**

Hence: The LCS drainage net material is capable of draining the leachate from the 100-year, 24-hour storm at a faster rate than it is generated, or:

$$Q_{net} > Q_{100}$$

TABLE 7.7-4 (CONT.)
DESIGN CALCULATIONS FOR PRIMARY LCS FOR LTU

Pipe System Flow

The flow rate through piping is given by Manning's Equation as:

$$Q = \left(\frac{1.486}{n}\right)(A)(R^{0.67})(S^{0.5})$$

where: Q = flow rate (cfs)
n = Manning's roughness coefficient
A = cross-sectional flow area of pipe (sf)
R = hydraulic radius (ft)
S = hydraulic gradient (ft/ft)

For one 4" pipe: $n = 0.01$
$A = 3.14(D^2/4) = 0.087$ sf
$R = A/[(3.14(D)] = 0.083$ ft
$S = 0.01$

Thus: $$Q = \left(\frac{1.486}{0.01}\right)(0.087)[(0.083)^{0.67}][(0.01)^{0.5}]$$

$$= 0.246 \text{ cfs}$$

For 4 pipes:

$$Q_{Tot} = \mathbf{0.983 \text{ cfs}}$$

Hence: The 4" polyethylene drainage pipes can effectively drain the volume of leachate generated during the 100-year, 24-hour storm from the LTU, or:

$$Q_{Tot} > Q_{100}$$

(1) Equation taken from Earthen Liners for Land Disposal Facilities by David E. Daniel, M. ASCE. Presented at "Geotechnical Practices For Waste Disposal", ASCE Conference, June, 1987.

(2) Impingement rate of 1.4E-05 cm/sec taken as the low-side hydraulic conductivity of the LTZ soil mixture.

(3) Hydraulic conductivity of 50 cm/sec chosen as a conservative estimate of the k value for TENAX CE 2 or GUNNET XL-4 at a hydraulic gradient of 2%.

(4) Inflow rate taken from: (7.3 inches of total rainfall) - (6.12 inches of runoff) during 24-hour period. See discussion in Subsection 7.7.3.3.

and (3) flow of leachate out of the system through the 4" polyethylene drainage pipes. As indicated by the calculations, the primary system will be capable of removing the volume of liquid at a rate faster than the impingement rate into the system during the 100-year, 24-hour storm.

7.7.1.8 Treatment Zone and Surficial Soils

The land treatment zone (LTZ) will be constructed utilizing a mixture of native soils and imported clay backfilled above the primary leachate collection system and extending to a depth of five feet (1.5 meters) below the initial surface. Since the unsaturated zone extends approximately ninety feet below the LTU site, the base of the treatment zone will obviously be more than the required minimum three feet (1 meter) above the seasonally high water table. The LTU will be designed to degrade, transform, or immobilize all hazardous constituents from applied wastes within the treatment zone.

Since the LTZ will be comprised of a specified mixture of native soils and imported clay, the physical properties of the existing surficial soils at the site will be altered. The target physical and chemical properties of the soil mixture for the LTZ are presented in Table 7.7-5.

7.7.1.9 Containment Berms and Buffer Areas

Compacted clay berms will be constructed around the entire perimeter of the interior area of the LTU. The 3:1 slope of the interior sides of the berms results in an interior buffer area nearly 20 feet wide around the active waste application area. This buffer area will be utilized for the construction of a caliche access road and a runoff drainage channel along the border of the active area.

The berms will provide 3.5 feet of freeboard above the LTU waste application area. This freeboard will provide run-on/runoff control and additional volume to contain future solids buildup on the active surface of the LTU. The crest of the berms will be 10 feet wide to facilitate

TABLE 7.7-5

TARGET SOIL PROPERTIES FOR LAND TREATMENT ZONE MIXTURE - LTU

Soil Classification	Loam to clay loam
Permeability (triaxial method) cm/sec	$5x10^{-4}$ to $1.4x10^{-5}$*
Soil pH	7.0 to 8.0
Available water holding capacity (cm H_2O/meter soil depth)	>10
Cation Exchange Capacity	>15

* Range chosen is near the lower limit of permeabilities considered acceptable for land treatment soils. The conservative range was chosen as an added "protection" of leachate quality. It is also recognized that laboratory estimates of permeability are often much lower than actual (in situ) permeability.

vehicle access. The exterior 4:1 slope will result in a total berm width at the base of 34.5 feet and an exterior buffer area 45 feet wide around the entire LTU. This exterior buffer area will be used for run-on diversion ditches and vehicle access to the LTU. A security fence will be constructed around the entire unit with a sand fence along the northern and western boundaries to minimize the accumulation of wind blown sand on the LTU surface. Erosion protection of the clay berms will be accomplished through the application of asphalt to the sides.

7.7.2 Run-on Diversion

7.7.2.1 Introduction

The flow patterns of stormwater runoff in the vicinity of the LTU site are illustrated in Figure 7.7-1. The flow patterns were determined using the topographic map included as Figure 7.1-1. Flow patterns are complex due to the presence of several old tank dikes to the east and south of the LTU site. Final drainage patterns may be revised prior to construction based on a survey check. A run-on diversion system will be designed to prevent flow onto the active portion of the LTU during the peak discharge from the 100-year, 24-hour rainfall event.

7.7.2.2 Area Drainage and Determination of Peak Runoff Flow Rates

Run-on prevention at the LTU site is to be provided by an exterior berm surrounding the LTU and stormwater collection basin. At the outside toe of the berm, a 1-foot deep conveyance channel will be constructed to route the stormwater away from the LTU site. The conveyance channel will have a bottom width of 5 feet with a 3:1 side slope on the outer wall and a 4:1 slope toward the berm. The berm will be covered with asphalt. At the southwest corner of the stormwater basin, an 8-foot wide conveyance channel will be provided to route the run-on flow. The run-on diversion system is shown on a drawing included with the engineering plans.

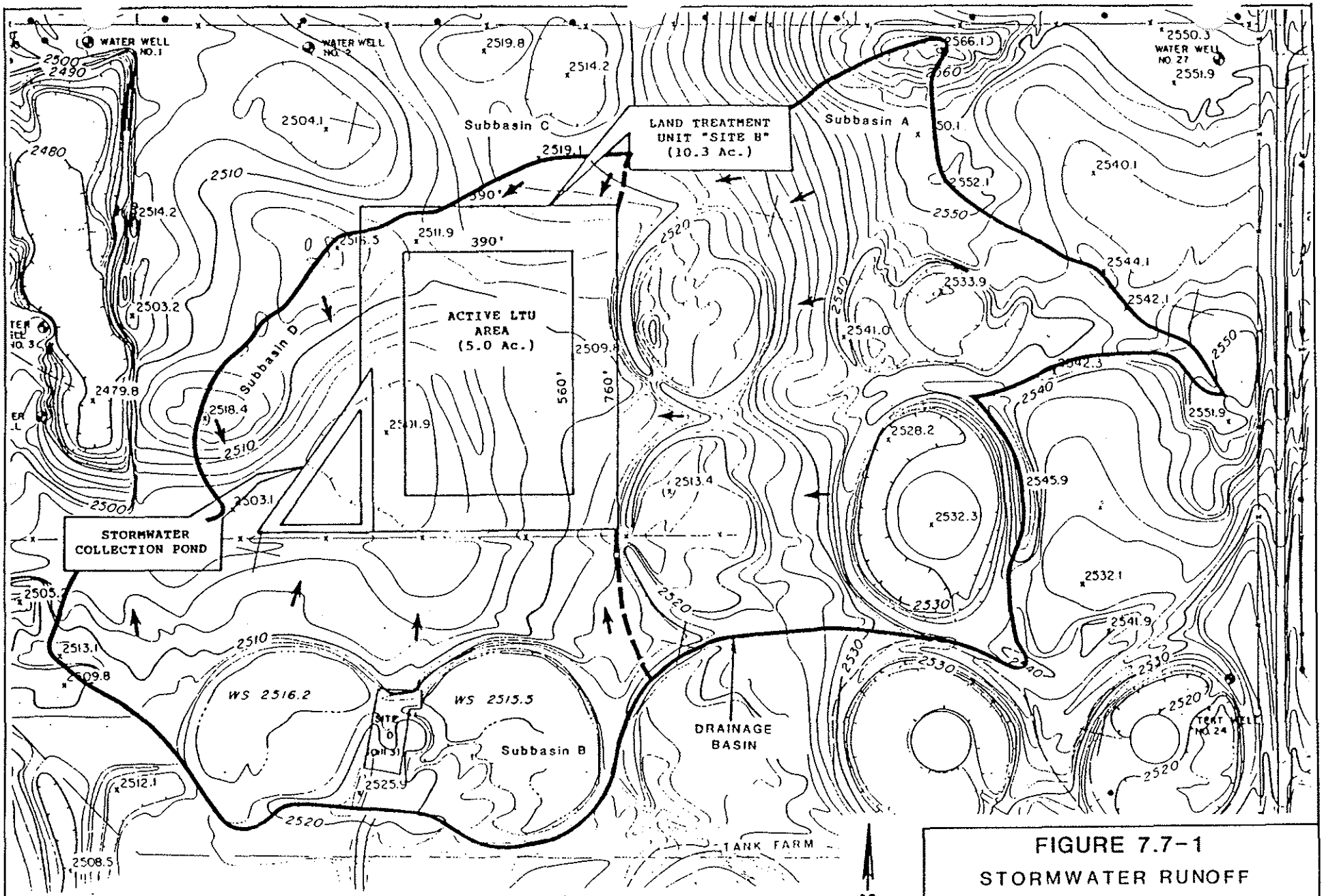

FIGURE 7.7-1

STORMWATER RUNOFF FLOW PATTERNS-LTU

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Most of the drainage area contributing flow to the conveyance channels will be to the east and south of the LTU as depicted in Figure 7.7-1. From east of the site (Subbasin A), 29.8 acres drain toward the LTU while 17.7 acres (Subbasin B) to the south of the site also drain toward the LTU. A minimal amount of drainage would occur from the north (Subbasin C) and west (Subbasin D) of the site, with the drainage areas encompassing only 1.3 and 2.1 acres, respectively.

Since the land area involved is relatively small, the most appropriate means of calculating the peak discharge from the drainage area as a result of the 100-year, 24-hour rainfall event is the Rational Method. This method uses the following equation to determine peak flow:

$Q = CiA$, where

Q = discharge in cubic feet per second (cfs)
C = runoff coefficient based on soil and vegetation types
i = rainfall intensity in inches per hour at the time of concentration, and
A = contributing drainage area in acres

The State Department of Highways and Public Transportation (SDHPT) Bridge Division Hydraulic Manual suggests a runoff coefficient (C) of 0.15 to 0.20 for unimproved areas with sandy or sandy loam soil at a slope of 0-3 percent. In this analysis, a runoff coefficient of 0.40 was selected to provide a conservative estimate of peak flow.

Rainfall intensity for the 100-year, 24-hour storm in Howard County, Texas was calculated from an equation provided in the SDHPT Hydraulic Manual. The time of concentration for the calculation was estimated at each corner of the conveyance channel. Drainage length, Manning's n value, and surface slope were used to estimate the time of concentration (t_c) for overland and channelized portions of the drainage area.

The peak flow was computed for five drainage conveyance channel sections in order to determine if the exterior berm would adequately protect the LTU from stormwater run-on. A trapezoidal channel with 3:1 side slopes was assumed. A Manning's n value of 0.02 was used for channelized flow.

The following is a summary of the analysis for each portion of the conveyance channel:

Channel Location	t_c (min)	i (in/hr)	Q (cfs)	Depth of Flow (ft)	Berm Ht (ft)
Subbasin A	34	4.9	58.2	1.1	2.0
Subbasins A + B	42	4.3	81.4	1.3	2.0
Subbasin C	18	7.0	3.6	0.2	2.0
Subbasins C + D	25	5.9	20.0	0.6	2.0
Subbasins A+B+C+D	42	4.3	87.3	1.4	-

A channel slope of 1 percent will be provided in the 5-foot wide conveyance channels surrounding the LTU. The 8-foot wide channel from the southwest corner of the LTU will be graded to a slope of 0.5 percent.

As shown in the preceeding analysis, the resultant rainfall runoff from the 100-year, 24-hour flood event will not reach a depth that will exceed the minimum height of the containment berms. The berm structure will provide more than enough protection to prevent run-on. The conveyance channels will contain most of the peak stormwater flow. Since the channel will be one foot deep, for depths in excess of one foot, the water will overflow the outside edge of the channel. However, no problems are anticipated due to this minor out-of-channel condition that may result from a 100-year, 24-hour flood.

7.7.3 Runoff Control

7.7.3.1 Introduction

Runoff resulting from direct precipitation occurring on the LTU will be contained within the interior of the unit by asphalt-covered containment berms which will completely encircle the interior LTU area. The flow of stormwater across the surface of the LTU area will generally be from northeast to southwest (following the 1-2% surface gradient) and will be conveyed along a concrete drainage channel located along the southern interior boundary of the LTU to a series of five 18-inch reinforced concrete pipes (see Sheet 9 of the engineering plans). These pipes will penetrate the berm and convey the stormwater runoff by gravity into the adjacent stormwater collection/retention pond. Stormwater from this pond will be pumped to the refinery's process water sewer system for treatment. Detailed drawings of the runoff control system are included on Sheet 8 of the engineering plans. Ultimately, the runoff collected from the LTU will flow after treatment into Refinery Lake (WP-6) which is permitted to receive process wastewater and runoff from the refinery site under TWC Waste Control Order 01768.

7.7.3.2 Stormwater Collection Pond

The stormwater collection pond will be located adjacent to the southwest corner of the LTU (see Figure 7.1-1) and will be utilized to retain stormwater runoff from the interior area of the LTU. Since runoff from the LTU is not expected to be a hazardous waste, the stormwater collection pond will not be permitted for service as a hazardous waste management unit. It will, however, be designed with a double synthetic liner system in accordance with the MTR liner requirements for surface impoundments and will provide high assurance against the migration of stormwater into the soils underlying the pond.

The stormwater pond will be designed with a maximum operating volume of 1.1 million gallons (150,000 cubic feet) to contain the anticipated surface runoff from a 100-year, 24-hour storm event.

7.7.3.3 Determination of Peak Runoff Volumes and Flow Rates

Although the active LTU area will cover 5 acres, the entire interior area (including interior berm faces, access road, and buffer area) requiring runoff control will encompass nearly 6.5 acres. The peak runoff from the LTU will be contained by the 3.5-foot high berms surrounding the entire unit. It should be noted that due to the surface grading, typical berm heights are greater on the interior of the berm than on the exterior. The soils of the land treatment zone will be comprised of a mixture of onsite sands and imported clays.

Due to the small drainage area, the Rational Method (as previously discussed in Subsection 7.7.2) is the recommended approach to determine peak discharges. A runoff coefficient (C) of 0.70 was utilized in order to obtain a conservative peak runoff estimate. Based on an average LTU slope of 2 percent, a time of concentration (t_c) of 15 minutes was calculated. The appropriate 100-year, 24-hour rainfall intensity value is 7.7 inches per hour, as determined from the SDHPT Hydraulic Manual for a 15-minute rainfall in Howard County, Texas. The calculated peak discharge from the 6.5-acre interior LTU area is 35.0 cfs. This stormwater will drain to the southwest corner of the LTU where a series of five parallel 18-inch reinforced concrete pipes will convey the runoff to the stormwater collection basin. Based upon the design values of a 2 percent pipe slope and a Manning's n of 0.013, these five pipes have a maximum capacity of at least 40 cfs.

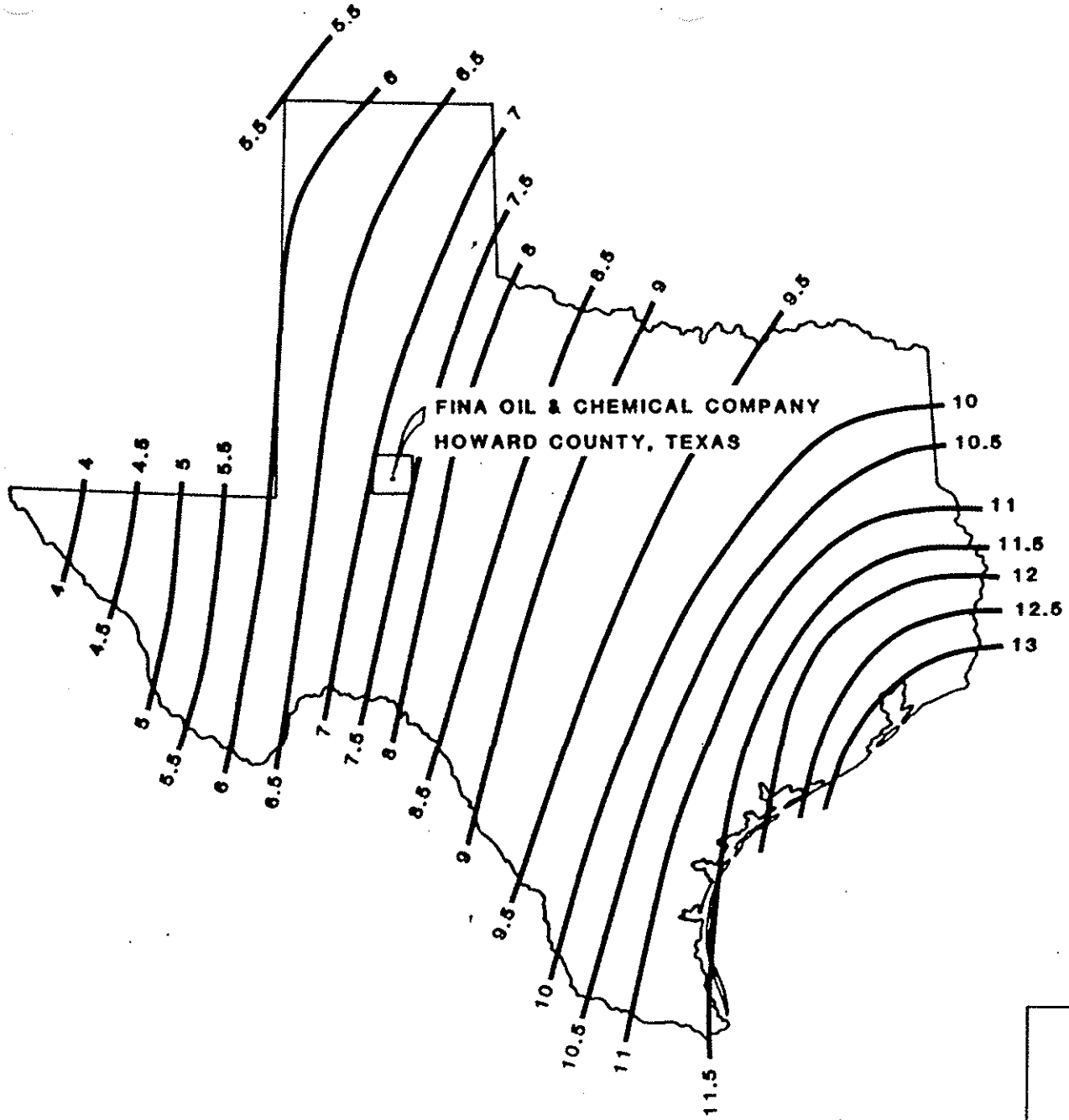
The volume of runoff requiring storage was determined utilizing the U.S. Army Corps of Engineers HEC1 Flood Hydrograph Package. Using this computer model, the Soil Conservation Service (SCS) Curve Number Method was employed to determine the volume of runoff from the LTU and associated interior areas. The SCS Curve Number Method determines a time history and volume of runoff. For small areas such as the 6.5-acre LTU area, the SCS Curve Number Method provides an accurate determination of the volume of runoff. (The Rational Method should be used, however, to calculate the peak flow for sizing the conveyance channel and piping for areas of this size.)

A Curve Number of 90 was calculated to represent runoff potential from the LTU and associated interior areas (the higher the value of the Curve Number, the greater the amount of runoff produced by a given rainfall event). This value of 90 represents an area-weighted average utilizing Curve Numbers of 98 for asphalt-covered berms, 89 for caliche roads, 83 for the buffer areas, and 90 for the active LTU area. These values were selected from the National Engineering Handbook (Section 4, Hydrology, Chapter 9), August, 1972. The runoff was then determined with the HEC1 model for the 100-year, 24-hour rainfall for the Big Spring, Texas area using a total rainfall of 7.3 inches as indicated on Figure 7.7-2.

Total runoff was computed to be 6.12 inches, or 144,900 cubic feet from the interior LTU area. Total storage required will be somewhat less, since the pumps to deliver the stormwater for treatment will come on as the stormwater level rises in the collection pond. Conservatively assuming that the pumps will be on only 12 hours during the rainfall event, 100 gpm will be pumped from the basin resulting in a total pumped volume of 9,600 cubic feet. Therefore, the total storage volume required in the stormwater pond to contain the 100-year, 24-hour storm is 135,300 cubic feet. The basin is designed with a volume of 150,000 cubic feet without resulting in any backwater influence on the five stormwater conveyance pipes. Also provided will be a 3-foot freeboard in addition to this volume. With the design pumping rate of 100 gpm to the treatment system, 7.5 days would be required to empty the full basin. The pump will be triggered into operation by a level control based on the depth of water in the basin sump.

7.7.4 Wind Dispersal

Wind dispersal of LTU soils may occur during dry, windy weather conditions, especially if the zone of incorporation is also being disked at the same time. Dust control measures expected to be effective for controlling wind dispersal of LTU soils include limiting dust producing activities during dry, windy conditions and taking action to add



REF: WEATHER BUREAU NO. TP 40

FINA OIL & CHEMICAL

100-YEAR 24-HOUR RAINFALL (INCHES)

FIGURE 7.7-2

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moisture to the uppermost LTU soils. The sand fence, located on the north and west sides of the LTU site, will also help control wind dispersal.

Inspections for wind dispersal of particulates will be performed on a weekly basis unless weather conditions warrant more frequent inspections. In periods of dry and windy weather, wind dispersal of LTU soils may become a problem and occasionally dust may be raised during disking operations. During these periods, disking activities will be suspended and water will be applied to the waste application area as needed, utilizing a tank truck with attached spray pipes. Observations made during the inspections and applications of water for dispersal control will be noted on the inspection logs. Water for wind dispersal control will be available from the primary leachate collection system and stormwater retention pond associated with the LTU. If necessary, water can be obtained from Fina's raw water supply system.

7.7.5 Land Treatment Demonstration

7.7.5.1 Introduction

The land treatment demonstration (LTD) will follow the EPA document entitled Permit Guidance Manual on Hazardous Waste Land Treatment Demonstrations (January 1986). The LTD will use the following approach to demonstrate that hazardous constituents are degraded, immobilized, or transformed in the land treatment zone (LTZ):

- A review of existing literature concerning the land treatment of refinery wastes.
- Waste characterizations to determine the principal hazardous constituents (PHCs) present in the applied wastes.
- Laboratory immobilization studies to determine partitioning coefficients for RITZ model simulations.
- A field plot study to (1) demonstrate that all PHCs from applied wastes can be completely degraded, transformed, or immobilized within the treatment zone, and (2) aid in defining control parameters for operating the LTU.

Although the literature contains much documentation of the biodegradability of refinery wastes, it will be especially important to conduct the laboratory tests and computer simulations because the soils of the LTZ will be created by mixing in situ sands with imported clays.

The field plots will be operated using similar procedures and equipment as will be used on the full-scale LTU. The design of the field plots is summarized in Subsection 7.8. Three field plots will be utilized and operated as follows:

1. Field Plot 1: Waste loading rates will be those established for sizing the LTU (470 bbls oil per acre per year).

2. Field Plot 2: Oil loading rate will be 20% greater than that established for sizing the LTU. The higher loading rate will still be within the range of loading rates commonly used at refinery LTUs and, if successful during the LTD, may result in higher permissible loading rates in the permit.

3. Field Plot 3: Background plot - will be used to collect background soil core and leachate data during the field plot study.

If appropriate, the particular parameters investigated in Field Plot 2 will be modified based on the results of LTD laboratory studies. However, the investigative parameters will not be modified without the prior written authorization from the TWC.

The field plot study (and ultimately the LTU) will be utilized to treat the following hazardous wastes:

- Leaded Tank Bottoms (K052)
- Ignitable Petroleum Product Tank Bottoms (D001)
- Slop Oil Emulsion Solids (K049)
- API Separator Sludge (K050, K051)
- Ignitable Spill Cleanup Waste (D001)
- Ignitable Spent Treating Clay (D001)

Tank bottoms and spent treating clay are generated infrequently and in relatively small volumes. Slop oil emulsion solids are generated as a filter cake from a rotary vacuum filter and the API separator sludge

will be dewatered in a filter press prior to disposal. Both wastes will be land treated on a routine basis. Ignitable spill cleanup waste is also generated on a fairly routine basis and usually represents large volumes of soil mixed with small volumes of spill material. Future operating procedures will substantially reduce the soil volume that is utilized to contain the spilled material.

In summary, the land treatment demonstration will include (1) a literature review of the land treatability of refinery wastes, (2) chemical characterizations of all hazardous wastes that will be applied to the LTU to determine candidate PHCs, (3) laboratory studies that will investigate the mobility of the wastes in a waste-soil environment that simulates the full-scale LTU, (4) RITZ computer simulations that will predict the long-term fate of PHCs in the land treatment zone, and (5) a field plot demonstration that will confirm the treatment of hazardous wastes on a small-scale version of the LTU.

7.7.5.2 Land Treatment Demonstration Methodology

- Literature Review

The following literature review concentrates on land treatment variables that are most applicable to the Fina LTU. For example, land treatment in clayey soil, high water table environments, or cold climates are not discussed in detail because these conditions do not exist at the Fina site. When appropriate, existing conditions at the Fina site and their relationship to the literature are discussed in this section.

Introduction: The most extensive use of land treatment has been in the refining industry and as a result there is much documentation of successful land treatment of refinery wastes. There are very few site characteristics that prevent the use of a site for land treatment if the site is operated and monitored properly. Land treatment of refinery wastes has been practiced successfully in all major climatic regions of the United States under a wide

range of hydrogeological conditions. A wide variety of soil types, ranging from fine sand to clay, have been used as a treatment medium. The land treatment of most refinery wastes focuses on the breakdown of the hydrocarbon fraction by aerobic microorganisms in the top layer of soil where oxygen is available. Metabolism of the wastes by these microorganisms ultimately oxidizes the hydrocarbon to carbon dioxide and water.

Site Characteristics: Soil characteristics important to the proper operation of a land treatment unit are the slope of the site, soil texture and permeability, soil moisture content, pH, and cation exchange capacity (CEC).

Slope is an important consideration when evaluating the erosion potential of the land treatment unit resulting from rainfall runoff. Slopes in excess of five percent generally are not recommended for land treatment units due to erosion problems (API, 1983). Since the overall slope of the LTU at Fina will average approximately two percent, erosion is not considered a problem. The arid climate and the well-drained soil properties of the site further reduce the likelihood of soil erosion.

Soil texture and permeability are important considerations when evaluating the treatment environment for the wastes and the potential for migration beyond the treatment zone. Native sandy soils, like those that exist at the Fina site, would permit rapid infiltration of applied liquids and precipitation into the treatment environment and facilitate soil aeration. However, the high permeability and low adsorptive capacity of sandy soil might not control pollutant migration as well as soil with a higher clay content. All the soils at Fina are classified by the Soil Conservation Service as Springer loamy fine sand. The land treatment zone (LTZ) will be comprised of a pre-determined mixture of these soils and imported clay. This mixture will provide a suitable environment for aerobic biological activity on the soil-waste mixture and will facilitate adequate use of immobilization mechanisms in the treatment zone.

The lower permeability of the LTZ soil resulting from the addition of imported clay will also inhibit the migration of hazardous constituents beyond the treatment zone. In addition, research on soil wet-ability following application of an oily waste to soil indicates that the oil may decrease infiltration rates by as much as two orders of magnitude (Brown et al., 1982).

The aerobic biodegradation of organics in soil is greatest when the moisture content is 50 percent to 70 percent of the soil water holding capacity (Bartha and Dibble, 1979). Extremely wet soils decrease biodegradation by limiting oxygen availability. The LTZ soils at the Fina LTU will have a moderate available water holding capacity. The arid climate at the site will possibly make the lack of available moisture during periods of low waste incorporation and low rainfall at the LTU a factor in decreased biodegradation at the unit. However, most of the refinery wastes to be treated at the LTU contain from 20-30 percent water.

Soil pH and cation exchange capacity (CEC) are important considerations when evaluating the potential migration of heavy metals present in the applied waste. The pH generally should be maintained between 7 and 8 to maximize immobilization of metals. The pH of the soils of the Springer loamy sand vary from neutral to slightly alkaline (USDA, 1969). Hence, the resultant LTZ mixture should reflect a pH within this range.

The CEC value is an indication of the relative capacity of a soil to retain metal ions and is defined as the total amount of exchangeable cations that a soil can adsorb measured in meq/100g of soil. Generally, sands have low CECs due to their low surface area. The addition of clay to the native sands to create the LTZ will increase the CEC value to a viable range. According to Fuller (1986), soils with CEC values between 5 and 10 meq/100g are marginal for siting a land treatment unit. However, most metals in

refinery wastes exist in compounds that are not very water soluble. According to API (1983), with proper pH management, metals are effectively immobilized within the treatment zone even at sites with low CEC values. The CEC of the soil mixture for the Fina LTU is expected to be at least 15 meq/100g.

Soil Amendments: Soil amendments to increase soil pH will most likely not be necessary at the Fina LTU. However, the addition of lime to the soil can be used in the event that low soil pH becomes a problem. The land application of wastes with high organic carbon may result in the depletion of nitrogen in the soil which can result in a decrease in biodegradation rates. At some land treatment facilities, the C:N ratio may be especially low and the addition of nitrogen fertilizer may stimulate microbial activity. The EPA (1983) suggests a C:N:P ratio of 50:2:1 as a broadly applicable recommendation to achieve acceptable waste treatment results. Excessive nitrogen in the soil will convert to nitrate, a mobile anion which can leach and contaminate ground water. Irrigation has been used as a method of soil moisture control by a few facilities in arid climates. The practice is not common even in arid environments because the waste liquid loadings will usually maintain a suitable soil moisture content for biological activity.

Soil Temperature: Laboratory studies have documented that optimal soil temperature for biodegradation of oily wastes is 68 ^{o}F or greater (Dibble and Bartha, 1979). Soil temperature for bare surface soils are commonly greater than ambient temperatures by 4 ^{o}F to 10 ^{o}F during daylight hours. Surface soil temperatures at land treatment sites may exceed ambient temperatures by a greater amount due to increased microbial respiration and the increased radiant energy absorption due to the darker soils which result from oil application. Although little biodegradation occurs when the soil temperature approaches freezing, the soil temperatures at

the Fina facility rarely approach freezing during the winter months. At the LTU, biological activity will occur nearly every day of the year, although at reduced rates during the winter.

Salt Accumulation: Electrical conductivity (EC) is a measure of the concentration of salts in a solution. According to the EPA (1983), soil EC values less than 4,000 umhos/cm will have little effect on plant growth. In soils with EC values between 4,000 and 8,000 umhos/cm, some restriction on plant growth may occur; however, no vegetation will be grown on the Fina LTU. The extent of accumulation of salts is greatly influenced by climate. In arid environments, the API (1983) found soils in land treatment units with EC values between 3,000 and 10,000 umhos/cm. These levels did not impair microbial degradation.

Waste Characteristics and Treatment: A wide variety of wastes from refineries have been successfully degraded and immobilized by land treatment. The primary constituents that affect application rates of refinery wastes are oil content and several heavy metals. The primary treating mechanisms are biodegradation of the oil and immobilization of the metals. Most of the biodegradation activity and immobilization occurs in the upper 12 inches of the soil known as the zone of incorporation (ZOI). A limited amount of activity occurs between the ZOI and the limits of the treatment zone at a depth of five feet. Below the treatment zone, soil conditions are generally not conducive to biological activity, primarily due to the lack of available oxygen.

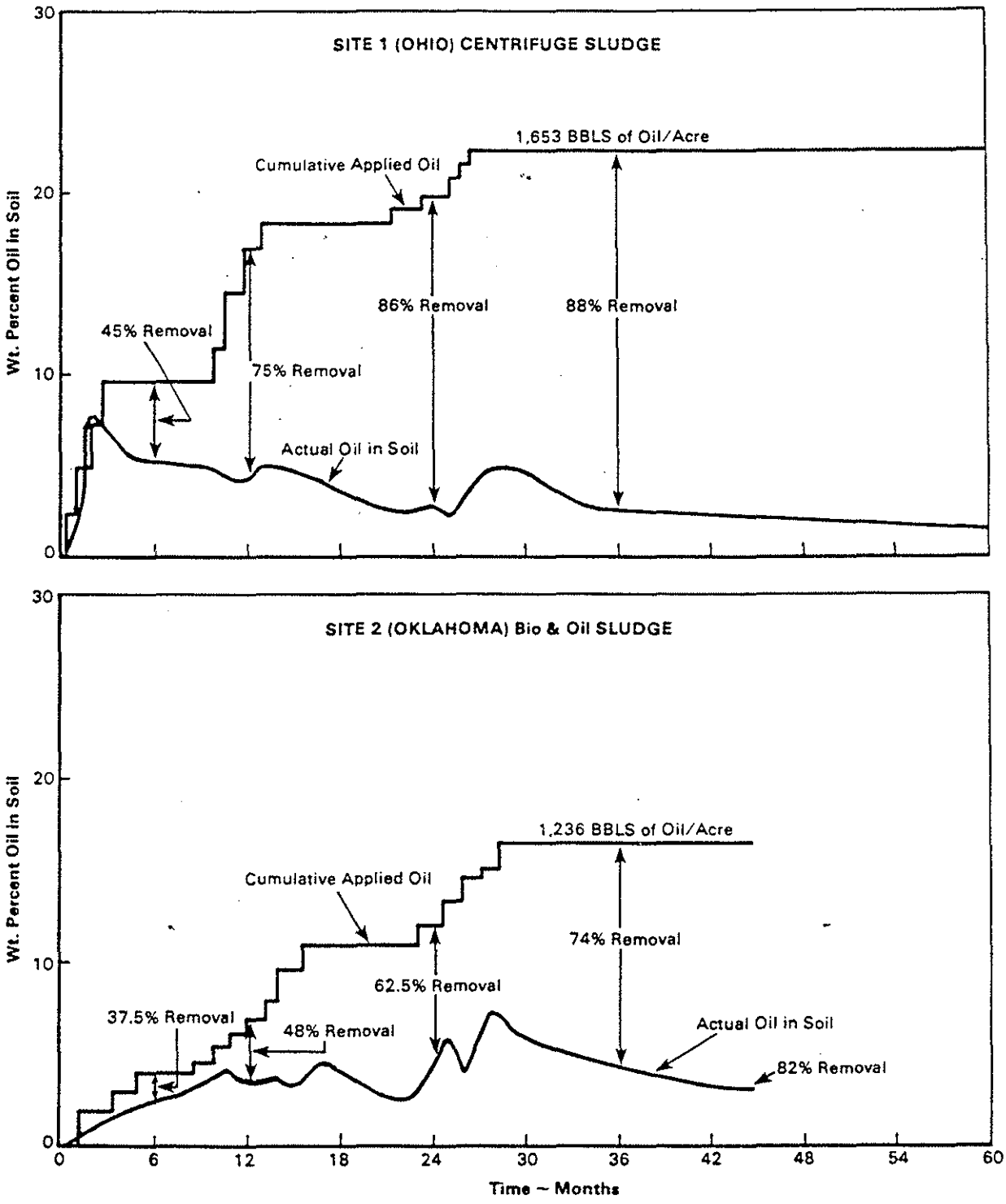
The efficiency of biodegradation is dependent upon such factors as soil temperature, pH, nutrient availability, and moisture content. Certain metals, most notably lead and chromium, have accumulated significantly above background levels in surface soils at many refinery land treatment facilities. The metal concentrations tend to attenuate with depth and generally approximate background levels

within one to three feet below the ZOI (API, 1983). The lack of mobility of metals in most refinery wastes is due to the highly insoluble forms of metal complexes in the wastes (Weldon, 1980).

Refinery wastes contain a varied mixture of hydrocarbons that biodegrade at different rates. In general, the multiringed compounds degrade slower than the saturated hydrocarbons or aromatic hydrocarbons with one or two rings. However, the multiringed compounds are very insoluble and consequently will not migrate readily through the treatment zone. The EPA has derived a list, commonly called the Skinner List, consisting of 43 specific organic compounds and 12 metals which could potentially be present in refinery wastes. The waste characterization analyses, laboratory studies, and field plot study will serve to identify the principal hazardous constituents present in the wastes that are to be treated at the LTU.

Waste Loading, Accumulation, and Removal: In a review of land treatment facilities at 14 refineries in the U.S., the API (1983) found high oil removal efficiencies at all the facilities. A linear relationship was found between oil removal rates and oil loading rates. The maximum degradation of oily waste appears to occur when the quantity of waste applied in a single event is limited to less than five percent oil in the soil (Dibble and Bartha, 1979). The maximum amount of oil which can be handled as a one time loading is approximately 300-400 barrels of oil per acre per application (API, 1983). It is uncertain whether inhibition of biological activity at higher loading is the result of toxicity or oxygen depletion.

At land treatment facilities studied by the API, the average annual oil reduction for most facilities averaged between 70 and 90 percent. The reduction rate does not imply that 10 to 30 percent of the annual oil loading accumulates in the soil each year. The 10 to 30 percent residual oil will continually degrade in the dynamic treatment medium. This accumulation would continue to degrade after waste applications were terminated. At new land treatment facilities, oil will accumulate in the soil during the first year of operation while the biological system acclimates to the waste. Once acclimated, a relatively steady state condition will develop where annual oil reduction approximates oil application as depicted in Figure 7.7-3. The oil content in the ZOI at most facilities averages between 0.5 to 10 percent.



FROM API, 1983

THE FIGURE SHOWS INITIAL ACCUMULATION OF OIL FOLLOWED BY RELATIVELY STEADY STATE OIL CONCENTRATIONS AFTER 3 YEARS OF OPERATION

REMOVAL RATES AT TWO PILOT SCALE FACILITIES
FIGURE 7.7-3

JONES AND NEUSE, INC.
Engineering and Environmental Consultants

REFERENCES

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API 1987. Land Treatability of Appendix VIII Constituents Present in Petroleum Refinery Wastes; Laboratory and Modeling Studies. API Publication No. 445, Health and Environmental Affairs Dept., April 1987.

Brown, K.W. and L.E. Deuel. An Evaluation of Subsurface Conditions at Refinery Landfarm Sites. Prepared for the American Petroleum Institute and the EPA, Grant No. CR 807868, 1982.

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EPA. Hazardous Waste Land Treatment. SW-874, EPA Office of Solid Waste and Emergency Response, Washington, D.C., 1983.

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United States Department of Agriculture, Soil Conservation Service. "Soil Survey, Howard County, Texas", 1969.

Weldon, R. "Atmospheric Emissions for Oily Waste Landspreading". Prepared for the American Petroleum Institute, Washington, D.C., 1980.

- Waste Characterizations

  Laboratory analyses will characterize the waste properties that are important to land treatment and quantify the hazardous constituents in the wastes that will be used in the laboratory and field plot studies. The waste characterizations will include analyses of Skinner List constituents and analyses of other parameters important in land treatment systems. The waste characterization analyses will be conducted prior to the LTD studies to develop a list of principal hazardous constituents (PHCs) for the field plot study and to evaluate the variability between the individual wastes. The required characterization analyses and schedule are shown in Table 7.7-6.

- Laboratory Studies and RITZ Model Simulations

  Laboratory studies will be limited to immobilization studies that will be used to determine partitioning coefficients in the same soil mix that will be used for the LTZ. It is felt that toxicity studies are not necessary because excessive loading rates will not be evaluated during the LTD and there is an abundance of literature that documents the effective biodegradation of refinery wastes at reasonable loading rates. In addition, it is felt that degradation studies are not necessary because values for degradation rate constants and half-lives for the organic constituents of concern can also be obtained through literature sources. Furthermore, according to an API study (1987) on the treatability of Appendix VIII constituents of refinery wastes, soil type appears to have little effect on degradation rates. Literature values of variables indicative of degradation rates for hazardous constituents will be used in the RITZ model during the LTD.

TABLE 7.7-6
LTD WASTE CHARACTERIZATION ANALYSES

Type	Skinner Constituents	Oil & Grease	% Moisture	% Solids	Total Organic Carbon	Electrical Conductivity	pH
Slop Oil Emulsion Solids	2*	12	12 (one per month**)	12	12	12	12
API Separator Sludge	2	8	8 (two per quarter)	8	8	8	8
Spill Cleanup of Ignitable Waste	3	24	24 (as generated)	24	24	24	24
Leaded Tank Bottoms	1	1	1 (as generated)	1	1	1	1
Petroleum Product Bottoms	3	3	3 (as generated)	3	3	3	3
Spent Treating Clay	1	3	1 (as generated)	1	1	1	1
Total #	12	49	49	49	49	49	49

*Skinner analyses will be conducted prior to the field plot study.
**Schedule of analyses during field plot study.

Immobilization studies are appropriate for evaluating the interactions of wastes with the LTZ environment, including soil, water, and air. Since soil type plays an important role in the imobilization mechanism (primarily through adsorption) and the LTZ soils will be created for the new LTU, the immobilization studies will provide critical data which will be incorporated into the RITZ model. The immobilization studies will result in estimates of partitioning coefficients, expressed in terms of concentrations of constituents in oil (K_o), soil (K_d), or air (K_h) phases relative to the concentration in the aqueous phase. The results of the studies will help verify the utility of the soil mixture that is selected for the LTZ as a land treatment medium.

The Regulatory and Investigative Treatment Zone (RITZ) model was developed in 1985 and has been periodically updated and expanded to incorporate features which increase its utility for evaluating the fate of hazardous constituents of wastes in several phases (soil, oil, water, and air) that would be present in the treatment zone of a land treatment unit. The data developed during the immobilization studies will serve as input to the RITZ model and the output results will describe the fate of each hazardous constituent in the treatment zone including an estimate of residence time and concentration. The output will also predict if the hazardous constituents will be completely degraded or immobilized within the treatment zone.

The model will provide a framework for evaluating the following factors:

(1) The selection of Principal Hazardous Constituents (PHCs).

(2) Effects of soil characteristics on treatment performance (soil type, soil horizons, and soil permeability).

(3) Effects of design and operating parameters on treatment performance (loading rate, loading frequency, plow zone depth, irrigation, and soil amendments).

(4) Effects of environmental factors on treatment performance (temperature and precipitation).

The RITZ model will also be used to predict the long-term fates of hazardous constituents in the land treatment system.

- Field Plot Study

The field plot study will be conducted for an anticipated 12-month period following the construction of the test plots. The construction details for the test plots are discussed in Subsection 7.8.1. Waste application rates and methods on the field plots will follow procedures that will reflect the full-scale operation of the LTU. The field plot monitoring program will include the collection of background samples and periodic samples from active field plots. Samples will be collected from surface soils, soil cores, leachate, and stormwater runoff and will be analyzed for principal hazardous constituents (PHCs) and other parameters that influence the operation of the LTU. The following is a discussion of the individual elements of the monitoring program.

Background Soil Cores: Background soil cores will be collected at two locations from each of the three plots prior to the application of wastes to the plots. In addition, four additional cores will be collected from the background plot at the end of the study. From each core, samples will be collected from 0-12", 12-30" and 30-48" intervals, resulting in a total of 30 background soil samples. Table 7.7-7 lists the analytical parameters for the samples.

Surface Soil Samples: Two surface soil samples will be composited from random locations within each active field plot (1 & 2) on a monthly basis resulting in a total of 48 samples during the 1-year field plot study. The surface soil samples will be used to evaluate the oil loading and nutrient conditions of the field plots and will be analyzed for the parameters listed in Table 7.7-8.

Soil Core Samples: Soil core samples will be collected at four random locations within each active field plot (1 & 2) on a quarterly basis. From each core, samples will be collected from the 12-30" and 30-48" intervals resulting in a total of 64 samples during the 1-year field plot study. Table 7.7-9 lists the analytical parameters for the samples.

Leachate Samples: Leachate samples will be collected on a quarterly basis from the leachate collection system of each field plot resulting in a total of 12 samples during the 1-year field plot study. The access wells of each of the three collection systems will be checked for leachate after rainfalls and samples will be collected as necessary. Table 7.7-10 lists the analytical parameters for the samples.

TABLE 7.7-7
LTD BACKGROUND SOIL CORE ANALYSES

Type	Number of Analyses
Bulk Density	18*
Moisture Content	30
Available Water Capacity	18*
Saturated Hydraulic Conductivity (triaxial method)	12**
Particle Size Distribution	18*
Cation Exchange Capacity	18*
Total Organic Carbon	30
Kjeldhal Nitrogen	30
Total Phosphate	30
pH	30
Oil & Grease	30

*Test done at beginning of study only.

**Tests done on 12-36" and 36-48" intervals at the beginning of study only.

TABLE 7.7-8
LTD MONTHLY SURFACE SOIL SAMPLE ANALYSES

Parameter	Number of Analysis
Oil and Grease	48
% Moisture	48
% Solids	48
Total Nitrogen	48
Total Phosphate	48
Total Organic Carbon	48
pH	48

TABLE 7.7-9
LTD SOIL CORE ANALYSES

	Number of Analyses
Table 3 Analyses	64
Skinner Constituents*	64

* A subset of Skinner constituents (PHCs) may be proposed following waste characterization analyses.

TABLE 7.7-10
LTD LEACHATE ANALYSES

	Number of Analyses
Total Organic Carbon	12
pH	12
Conductivity	12
Skinner Constituents*	12

* A subset of Skinner constituents (PHCs) may be proposed following waste characterization analyses.

Runoff Samples: Stormwater runoff samples will be collected on a semiannual basis from each of the field plots resulting in a total of 6 samples during the 1-year field plot study. Table 7.7-11 lists the analytical parameters.

7.7.6 Treatment Program

7.7.6.1 Introduction

An effective treatment program should maximize the degradation, transformation, and immobilization of hazardous constituents in the treatment zone. In order to accomplish this objective, the program should address the method and rate of waste application to the treatment zone as well as measures to control soil pH, enhance microbial activity, and control moisture content of the treatment zone.

7.7.6.2 Waste Application Methods and Rate

Wastes will be transported to the land treatment unit in vacuum trucks or dumpster trucks. The wastes will be deposited on pre-determined areas of the active LTU area. Further spreading and mixing will then be continued by means of a bulldozer. After spreading and mixing of the waste and soil is accomplished, the LTU active surface will be smoothed and graded, followed by tilling using a tractor and disk harrow. This operation will be conducted to leave any furrows parallel to the general direction of surface drainage contours.

The waste application rate has been estimated at 470 bbls/acre-year but may be modified based on the interpretation of data obtained from operation of the three field plots in the land treatment demonstration. It is expected that the hydrocarbon content of the wastes will be the application rate limiting parameter. Based on available information from the literature, it is expected that the hydrocarbons present in these wastes will have a half-life of less than 450 days. It is also expected that the maximum concentration of hydrocarbons in the 12-inch zone of incorporation will be less than 10 percent. The total capacity of the

TABLE 7.7-11
LTD STORMWATER RUNOFF ANALYSES

	Number of Analyses
Total Organic Carbon	6
pH	6
Oil & Grease	6
Skinner Constituents*	6

* A subset of Skinner constituents (PHCs) may be proposed following waste characterization analyses.

LTU will be calculated from a simple material balance based on the capability of the treatment zone to immobilize the constituent that is determined to be capacity limiting.

7.7.6.3 pH Management

The water phase of the wastes to be applied to the LTU has pH values nearly always in the 7 to 11 range. The soils of the LTU are expected to have pH values near 7. Therefore, pH management is not anticipated to be necessary. However, in the event that the soil-waste mixture has a low pH, lime will be added to the LTZ.

7.7.6.4 Microbial Activity Enhancement

The soil biota needs an adequate supply of nutrients to maintain their activity. The wastes to be applied to the LTU contain small amounts of phosphorous and nitrogen. Similarly, materials such as calcium, magnesium, potassium, sodium, and trace elements necessary to the enhancement of microbial activity are present in refinery wastewater and are therefore present in the water phases of the wastes to be applied to the LTU. Supplemental quantities of phosphorous and nitrogen may be required, and estimates will be based on the ratios of carbon, nitrogen, and phosphorous in the ZOI soils.

7.7.6.5 Moisture Control

Even though the Fina facility is located in a region that is characterized by arid weather conditions, moisture control on the LTU should not be a major problem. The water content of most of the more frequently applied wastes ranges from 20-30 percent and should be sufficient to sustain the hydrocarbon biodegradation process. During periods of extreme dryness, water will be added to the LTU through the use of a tank truck equipped with spray bars. Water will be obtained through Fina's raw water system, from the stormwater pond, or leachate collected from the LTU.

7.7.7 Food-Chain Crops

Food-chain crops will not be grown on the land treatment unit.

7.7.8 Ignitable or Reactive Wastes

The following ignitable wastes will be applied to the land treatment unit: (1) ignitable petroleum product tank bottoms, (2) ignitable spill cleanup waste, and (3) ignitable spent treating clay. No interim storage of ignitable wastes will occur on the LTU. Upon receipt of a load of ignitable waste, the waste will be immediately spread into the soil with a bulldozer and tilled into the ZOI with the disk harrow. This practice will minimize the volatilization of waste constituents and result in a non-ignitable soil-waste mixture in the ZOI.

No reactive wastes will be applied to the LTU.

7.7.9 Incompatible Wastes

No incompatible wastes will be applied to the LTU.

Alon USA, LP
Alon USA Big Spring Refinery – Big Spring, TX

Hazardous Waste Permit 50140
Part B Application
SWR No. 30083 / RN100250869 / CN600881783

SECTION VI
GEOLOGY REPORT

VI. Geology Report

Provide all Part B responsive information in Appendix VI. When preparing the physical format organize your submittal using the Format of Hazardous Waste permit Application and Instructions.

This portion of the application applies to owners or operators of new hazardous waste management facilities; areal and/or capacity expansions of existing hazardous waste management facilities; and existing industrial solid waste facilities that store, process or dispose of hazardous waste in surface impoundments, landfills, land treatment units, waste piles (except those waste piles that meet the requirements of Section V.E.10.b. of this application), and tanks or drip pads which require a contingent post-closure plan.

For a new Compliance Plan or modification/amendment to an existing Compliance Plan of Section XI of this application, submit a Geology Report which contains updated site geologic information derived from on-going investigations since submittal of the last Permit modification/amendment application.

Submit a Geology Report which includes at a minimum the following information. This report and all specifications, details, calculations/estimates and each original sheet of plans, drawings, maps, cross-sections, other graphics, such as limits of contamination maps, etc. or any other geoscientific work must be signed and sealed by a Professional Geoscientist licensed in the State of Texas under the Professional Geoscientists Practice Act.

A. Geology and Topography

1. Active Geologic Processes

Provide a description and interpretation of the active geologic processes in the vicinity of the facility. This description should include:

a. An identification of any faults (active or otherwise) in the area of the facility. The preparer should determine which Holocene sediments or man-made structures have been displaced. The report should contain a description of the investigation techniques used to identify faults and should assess the degree, if any, to which a particular fault increases the long-term potential for waste migration. The clearance required from active faults to ensure that liner systems will not be disrupted will be based upon site specific factors such as the zone of significant surface deformation, uncertainty in locating the fault, activity of the fault, and a distance to provide a reasonable margin of safety. These issues should be addressed when discussing the offset of an industrial solid waste facility unit from an active fault.

To satisfy the requirements of 30 TAC 305.50(a)(4)(D) and 305.50(a)(10)(E), for a proposed hazardous waste management facility or a modification or amendment of a permit which includes a capacity expansion of an existing hazardous waste management facility, submit the following.

(1) A geologic literature review should be conducted, from which useful information on the possibility of faulting at a given site may be revealed. This includes, but is not limited to, maps of surface faults, subsurface structure, and field investigations by the author(s).

(2) Descriptions and maps of faulting, fracturing, and lineations in the area are necessary. An aerial photo with lineation interpretations is suggested.

(3) The maps and cross-sections are to be constructed using an amount of data necessary to adequately describe the geology of the area. Surface data, including data regarding known surface expressions, such as surface faults, gas seeps, lineations, etc., should be accounted for in the subsurface interpretations. A surface structure map should be prepared, incorporating all of the subsurface data as well as known surface features.

(4) A minimum of two structural cross-sections, utilizing available oil field and/or water well electric log data, shall be made perpendicular to each other, crossing at the proposed surface unit location. These cross-sections should define geologic units, indicating especially Holocene sediments and Underground Sources of Drinking Water (USDWs), as well as lithology. The cross-sections should be constructed from the surface, down through the shallowest major structure or the base of the Holocene, whichever is deeper. These cross-sections need to be on a scale necessary to depict the local geology (3000' radius from the site location minimum). If needed to adequately describe the local geology, then a larger radius or deeper area of review may be necessary.

(5) A minimum of two structural subsurface maps need to be prepared. One map should be made on the shallowest mappable subsurface marker, the other on a deeper horizon that shows the underlying major structure. Additional maps may be necessary.

(6) Field surveillance will be necessary to check the area of the facility for surface features, such as lineations, and to investigate potential surface faults as indicated by, but not limited to, aerial photos, topographic maps, and seismic and subsurface structural maps.

(7) The above requirements do not limit the use of any additional information, such as seismic data, isopach maps, or potentiometric maps, that may help in defining the geology of the area of review.

(8) If faulting exists within 3000 feet of the surface unit, it must be demonstrated that the fault has not had displacement within Holocene time. If such a fault does exist, it cannot pass within 200 feet of the surface unit.

(9) If a fault that has been active within the Holocene is located within 3000 feet of the surface unit, it must be demonstrated that, a.) the fault is not transmissive, i.e., it will not provide for groundwater movement that would result in endangerment to human health or the environment, and b.) there is no actual and/or potential problem of subsidence, which could endanger the stability of the surface unit.

b. A discussion of the extent of land surface subsidence in the vicinity of the facility including total recorded subsidence and past and projected rates of subsidence. For facilities located at low elevations along the coast which have experienced appreciable rates of subsidence, the potential for future submergence beneath Gulf water should be addressed.

c. A discussion of the degree to which the facility is subject to erosion. The potential for erosion due to surface water processes such as overland flow, channeling, gullying, and fluvial processes such as meandering streams and undercut banks should be evaluated. If the facility is located in a low-lying coastal area, historical rates of shoreline erosion should also be provided.

d. Complete Table VI.A.1. - Major Geologic Formations

2. **Applicable to Land Based Units Only.** Regional Physiography and Topography (applicable only to owners or operators of facilities that store, process, or dispose of hazardous waste in surface impoundments, landfills, land treatment units, waste piles, except waste piles exempt from groundwater monitoring requirements, and tanks which require a contingent post-closure plan)

    a. Distance and direction to nearest surface water body
    b. Slope of land surface
    c. Direction of slope
    d. Maximum elevation of facility
    e. Minimum elevation of facility

3. **Applicable to Land Based Units Only.** Regional Geology (applicable only to owners or operators of facilities that store, process, or dispose of hazardous waste in surface impoundments, landfills, land treatment units, waste piles, except waste piles exempt from groundwater monitoring requirements, and tanks which require a contingent post-closure plan)

    Provide a description of the regional geology of the area. This section should include:

    a. A geologic map of the region with text describing the stratigraphic and lithologic properties of the map units. An appropriate section of a published map series such as the Geologic Atlas of Texas prepared by the Bureau of Economic Geology is acceptable.

    b. A description of the generalized stratigraphic column in the facility area from the base of the lowermost aquifer capable of providing usable groundwater to the land surface. At least the uppermost 1,000 feet of section below the facility should be described. The geologic age, lithology, variation in lithology, thickness, depth, geometry, hydraulic conductivity, and depositional history of each geologic unit should be described based upon available geologic information. Regional stratigraphic cross sections should be provided, where available.

4. Subsurface Soils Investigation Report **(Applicable to land based units or units requiring contingent closure and post-closure).**

This section should contain the results of an investigation of subsurface conditions for each land based unit and/or unit which requires contingent closure and post-closure care. If several units are in close proximity, a single investigation for the area will suffice. This report should include:

a. The logs of borings performed at the waste management area. All borings must be conducted in accordance with established field exploration methods. Investigation procedures should be discussed in the report. A sufficient number of borings should be performed to establish subsurface stratigraphy and to identify and allow assessment of potential pathways for pollution migration. Borings must be sufficiently deep to allow identification of the uppermost aquifer and underlying hydraulically interconnected aquifers. Borings should penetrate through the uppermost aquifer and all deeper hydraulically interconnected aquifers, deep enough to identify the aquiclude at the lower boundary. Borings should be completed to a depth at least 30 feet below the deepest excavation planned at the waste management area.

b. A text which describes the investigator's interpretations of the subsurface stratigraphy based upon the field investigation. If appropriate, soils may be assigned to generalized strata to aid in the discussion.

c. A text which describes the investigator's interpretations of the subsurface stratigraphy based upon the field investigation. If appropriate, soils may be assigned to generalized strata to aid in the discussion.

d. Complete Table VI.A.4. - Waste Management Area Subsurface Conditions and provide in the report data which describes the geotechnical properties of the subsurface soil materials. All laboratory and field tests must be performed in accordance with recognized procedures. A brief discussion of test procedures should be included. All major strata encountered during the field investigation phase should be characterized with regard to: Unified Soil Classification, moisture content, percent less than number 200 sieve, Atterberg limits (liquid limit, plastic limit, and plasticity index), and coefficient of permeability. Field permeability tests should be used to determine the coefficient of permeability of sand or silt units and should also be used to supplement laboratory tests for more clay-rich soils. In addition, particle size distribution and relative density based upon penetration resistance should be determined for coarse-grained soils. For fine-grained soils the following parameters should also be determined: cohesive shear strength based upon either penetrometer or unconfined compression tests, dry unit weight, and degree of saturation(s). For the major soil strata encountered, the maximum, minimum, and average for each of these variables should be compiled.

e. For land treatment units, provide a description of the surficial soils at the site which includes:

(1) The name and description of the soil series at the site;
(2) Important physical properties of the series such as depth, permeability, available water capacity, soil pH, and erosion factors;
(3) Engineering properties and classifications such as USDA texture, Unified Soil Classification, size gradation, and Atterberg limits (liquid limit, plastic limit, and plasticity index); and
(4) The cation exchange capacity (CEC) of the soil(s) expressed in units of meq/100g.

Much of this information may be obtained by consulting the county soil survey published by the United States Department of Agriculture, Soil Conservation Service. If available, a copy of an aerial photograph showing soil series units on the land treatment area should be provided.

If an aerial photograph is not available, include a soil series map as an attachment to this subsurface soils investigation report.

B. Facility Groundwater

If past monitoring has shown the presence of hazardous constituents in the groundwater, the owner or operator must submit a Compliance Plan Application with this application. The Compliance Plan Application and instructions can be found in Section XI of this application form.

1. Regional Aquifers

Provide a description of the regional aquifers in the vicinity of the facility based upon available geologic references. The section should provide:

a. Aquifer names and their association with geologic units described in Section VI.A.3.b.;

b. A description of the constituent materials of the aquifer(s);

c. A description of the water-bearing and transmitting properties of the aquifer(s);

d. Whether the aquifers are under water table or artesian conditions;

e. Whether the aquifers are hydraulically connected;

f. A regional water table contour map or potentiometric surface map for each aquifer, if available, from published references;

g. An estimate of the rate of groundwater flow in units of ft/yr;

h. Values for total dissolved solids content of groundwater from the aquifers;

i. Identification of areas of recharge to the aquifers; and

Note: An application for a new hazardous waste surface impoundment, waste pile, land treatment unit, or landfill, which is to be located in the apparent recharge zone of a major or minor aquifer, as designated by the Texas Water Development Board, must include a hydrogeologic report documenting the potential effects, if any, on the regional aquifer in the event of a release from the waste containment system. See the publication entitled Water for Texas, Today and Tomorrow (1990) or subsequent revision (Available at **http://www.twdb.texas.gov/waterplanning/swp/1990/index.asp**) for more information [30 TAC 305.50(6)]

j. The present use of groundwater withdrawn from aquifers in the vicinity of the facility.

The preparer should update Section III.C.1.e. of the Part A permit application to ensure that all water wells within 1 mile of the property boundaries of the facility have been located. The aquifer(s) yielding water should be identified for each well.

2. Provide groundwater conditions for each land based unit or unit which requires post closure care which includes all the information specified in 30 TAC 335.156-335.167. This discussion should also include:

a. Records of water level measurements in borings. The boring logs prepared in response to Section VI.A.4.a. should be annotated to note the level at which groundwater is first encountered and the level of groundwater after equilibration. Normally a 24-hour period is adequate for equilibration of groundwater but an extended period may be required for saturated clay deposits. This information should also be presented on the cross-sections required in Section VI.A.4.b. and recorded and retained in the facility groundwater monitoring record.

b. Records of historical maximum and minimum static water level measurements in monitor wells. Historic water level measurements made during any previous groundwater monitoring should be presented in a table for each well.

c. Upper and lower limits of the uppermost aquifer and deeper aquifers which are hydraulically interconnected to it beneath the facility boundary. In most cases this identification would include surface contour maps of the top and bottom surfaces. Indicate the typical depth at which groundwater is first encountered.

d. A site specific water table contour map or potentiometric surface map for the uppermost aquifer, and the basis for such identification (the information obtained from hydrogeologic investigations of the facility area). The predicted groundwater flow direction and rate should be indicated.

e. A discussion of the variation of hydraulic gradient across the site, including vertical gradient. Calculations for the maximum, minimum, and average groundwater flow velocities for each aquifer identified should also be provided, including pump test data where appropriate.

f. An analysis of the most likely pathway(s) for pollutant migration in the event that the primary barrier liner system is penetrated.

3. Description of the Detection Monitoring Program

It is important to note that even if the proposed program may use the same well system as the present program, the sampling parameters may be different.

a. Include in the design report a description of the proposed detection monitoring program. This description should contain all requirements of 30 TAC 335.163-335.164.

b. Provide a justification for the selected suite of waste specific parameters specified in Table VI.B.3.c. - Groundwater Sample Analysis based on toxicity, mobility, persistence, and concentrations in light and dense non-aqueous phase components of the waste.

c. (Sampling and Analysis Plan) Describe the proposed sampling and analysis methods, as well as statistical comparison procedures to be utilized in evaluating groundwater monitoring data. Note: Methods listed for use in groundwater programs may provide flexibility allowing for updates of the base method. For methods other than the standard acceptable methods, applicant must provide a demonstration that the proposed methods are appropriate for groundwater analysis per 30 TAC 335.163(5).

d. Specify the statistical method and process for determining whether constituent concentrations in groundwater are above background, in accordance with 30 TAC 335.163. Refer to the EPA guidance document entitled Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities - Unified Guidance (March 2009) (document # EPA 530-F-09-020) for recommended methods.

   All data submitted to the TCEQ shall be in a manner consistent with the latest version of the "*Quality Assurance Project Plan for Environmental Monitoring and Measurement Activities Relating to the Resource Conservation Recovery Act and Underground Injection Control*" (TCEQ QAPP) which a can be found on the agency's website.

   Monitoring samples and measurements shall be taken at times and in a manner so as to be representative of the monitored activity. The method used to obtain a representative sample of the material to be analyzed shall be the appropriate method from ***Ground Water, Volume II: Methodology***, (document # EPA/625/6-90/016b) or an equivalent method approved by the Executive Director of the TCEQ. Laboratory methods shall be those specified in ***Test Methods for Evaluating Solid Waste: Physical/Chemical Methods, SW-846***, 1987, as revised; ***Standard Methods for the Examination of Water and Wastewater, Fifteenth Edition***, 1980, and 1981 supplement, or current adopted edition; ***RCRA Ground-Water Monitoring: Draft Technical Guidance***, 1992, ***OSWER Directive 9950.1***, or an equivalent method approved in writing prior to use by the Executive Director. [30 TAC Section 305.125(11)(A)]

e. For inclusion into a permit, complete Table VI.B.3.b. - Unit Groundwater Detection Monitoring System to specify the proposed well system for each unit or waste management area which requires groundwater monitoring.

f. For inclusion into a permit, complete Table VI.B.3.c to specify:

(1) the suite of waste specific parameters (indicator parameters, waste constituents, or reaction products) which will be analyzed at each sampling event for each well or group of wells. These parameters must provide a reliable indication of the presence of hazardous constituents in the groundwater;

(2) the sampling frequencies and calendar intervals (e.g., monthly; quarterly within the second 30 days of each quarter; semiannually within the first 30 days of the 2nd and 4th quarters, etc.);

(3) the analytical method and the laboratory predicted detection limit and predicted Practical Quantification Limit (PQL) of the sample preparation and analysis methods for the selected parameters. This detection limit will represent the capability of the sampling and analysis to reliably and accurately determine the presence of the selected parameters in the sample; and

(4) the concentration limit which will be the basis for determining whether a release has occurred from the waste management unit/ area. Concentration limits shall be based on background values for the waste management unit/area, or PQL values developed through laboratory data obtained using practices consistent with the latest version of the TCEQ QAPP. If background values are lower than PQLs, the applicant may choose respective PQLs as concentration limits for hazardous constituents.

g. Submit drawings depicting the monitoring well design, current and proposed.

h. Submit at least one map of the entire facility and additional maps or drawings if necessary on one or more 8.5" x 11" sheets of sufficient scale to show the following in adequate detail:
   (1) Monitoring well locations, current and proposed;
   (2) Soil-pore liquid and core sampling points, current and proposed;
   (3) Waste management unit(s)/area;
   (4) Property boundary;
   (5) Point of compliance;
   (6) Direction of groundwater flow; and
   (7) Extent of any known plume of contamination

i. For the description of site-specific groundwater for inclusion in permit summary documents, please complete the following:

Table VI.A.2. Description of Uppermost Aquifer

C. Exemption from Groundwater Monitoring for an Entire Facility

In accordance with 30 TAC 335.156(b)(4), a waste management facility may be exempt from groundwater monitoring if the owner or operator can demonstrate that there is no potential for migration of liquid from any regulated unit to the uppermost aquifer during the active life of the regulated unit (including the closure period) and post-closure care period. This demonstration must be submitted with the permit application, and must be certified by a qualified geologist or geotechnical engineer.

This exemption does not apply to Unsaturated Zone Monitoring. Owners and operators of Land Treatment Units must monitor the unsaturated zone under all circumstances.

The following areas should be addressed in the demonstration, and any predictions must be made on assumptions that maximize the rate of liquid migration:

1. Thickness of soil between the base of the unit and saturated zone;
2. Thickness of saturated zone;
3. Head pressure of the fluids;
4. Properties of the saturated and unsaturated zone (including permeability, effective porosity, and homogeneity), and
5. Total life of facility

The criteria used for the evaluation of this demonstration are more stringent than those used for evaluations of demonstrations submitted prior to permitting. Thus it is necessary for an owner or operator to submit another demonstration even if one was submitted and approved previously.

This type of exemption differs from the exemptions described in Sections V.D. (Surface Impoundments), V.E. (Waste Piles), and V.G. (Landfills). An owner or operator may pursue a facility-wide exemption as well as an exemption for a particular unit, if the owner or operator wishes.

D. Unsaturated Zone Monitoring

1. List all hazardous constituents that have been or will be monitored.
   a. Current parameters.
   b. Proposed parameters.
2. Number of soil-pore liquid sampling points.
   a. Depth of sampling points.
   b. Equipment used for soil pore liquid monitoring.
3. Number of soil core sampling points.
   a. Depth of soil core sampling points.
   b. Indicate on a facility map locations of all sampling points.

Alon USA, LP
Alon USA Big Spring Refinery
Big Spring, TX

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APPENDIX VI
APPLICATION RESPONSES
Geology Report

Alon USA, LP
Alon USA Big Spring Refinery – Big Spring, TX

Hazardous Waste Permit 50140 - Part B
Application SWR No. 30083 / RN100250869 / CN600881783

SECTION VI
TABLES

Table VI.A.1. - Major Geologic Formations

Names Of Major Geologic Formation(s) Beneath The Facility	Lithology Of The Major Geologic Formation	Formation Thickness (Feet)	Depth To Top Of Formation	
			Feet/MSL(1)	Feet/BGS(2)
Eolian FM	Wind-blown silt and very fine sand	BICA Area: 0 to 20, [Avg. 5.4] Site E LTU: not encountered Site H LTU: 0 to 16, [Avg. 4.5]	BICA Area: 2367.7 to 2521.5, [Avg. 2446.5] Site E LTU: not encountered Site H LTU: 2509.0 to 2505.3, [Avg. 2506.9]	BICA Area: 2367.7 to 2521.5, [Avg. 2446.5] Site E LTU: not encountered Site H LTU: 2509.0 to 2505.3, [Avg. 2506.9]
Ogallala FM (upper sand Unit)	Very fine to medium, subangular silica sand with varying degrees of secondary CaCO3 cementation from very weak to moderately dense	BICA Area: 16 to 139, [Avg. 88.1] Site E LTU: 106.5 to 129, [Avg. 113.4] Site H LTU: 86 to 147, [Avg. 121.9]	BICA Area: 2363.7 to 2518.0, [Avg. 2445.2] Site E LTU: 2447.1 to 2467.4, [Avg. 2486.0] Site H LTU: 2491.3 to 2518.0, [Avg. 2503.6]	BICA Area: 0.0 to 20.2, [Avg. 5.9] Site E LTU: 0.0 Site H LTU: 0.0 to 16.0, [Avg. 6.2]
Ogallala FM (basal gravel Unit)	Fine gravel to cobbles, loose, subrounded silica and chert, isolated zones of intermixed clays and silts, areas where paleo-erosion has removed	BICA Area: 0 to 28, [Avg. 8.2] Site E LTU: 19.5 to 34.0, [Avg. 26.8] Site H LTU: 2 to 38, [Avg. 18.0]	BICA Area: 2340.0 to 2378.1, [Avg. 2357.0] Site E LTU: 2369.1 to 2387.4, [Avg. 2380.2] Site H LTU: 2356.7 to 2405.3, [Avg. 2379.6]	BICA Area: 20.0 to 150.0, [Avg. 92.4] Site E LTU: 99.0 to 110.0, [Avg. 105.9] S ite H LTU: 100.0 to 150.0, [Avg. 129.6]

Names Of Major Geologic Formation(s) Beneath The Facility	Lithology Of The Major Geologic Formation	Formation Thickness (Feet)	Depth To Top Of Formation	
Dockum FM	Red-bed clay, very hard, little to no evidence of bedding (massive) in upper 30 feet	Not fully penetrated at facility (penetrated upper 30 feet). Literature & Oil Field Logs show Dockum to be 800 to 1,450 feet thick in Big Spring Area	BICA Area: 2331.9 to 2367.3, [Avg. 2349.9] Site E LTU: 2349.6 to 2356.8, [Avg. 2353.4] Site H LTU: 2352.7 to 2371.0, [Avg. 2361.2]	BICA Area: 24.0 to 158.0, [Avg. 101.4] Site E LTU: 127.5 to 144.0, [Avg. 2353.4] Site H LTU: 137.0 to 158.0, [Avg. 148.6]

(1) MSL: Mean Sea Level

MLGL: Mean Low-tide Gulf Level

(2) BGS: Below Grade Surface

Table VI.A.4 - Waste Management Area Subsurface Conditions

Boring Number	Depth Below Grade	Stratum	USC Symbol	Liquid Limit*	Plasticity Index*	Percent Passing#200 Sieve	Permeability*	Percent Porosity*
Site E Testhole 4	4 - 5 feet	Clayey SAND, reddish-tan, wet, 17% clay, cohesive	SC	25	10	16.9	4.7E-06	~30
	6 - 7 feet	Clayey SAND, reddish-tan, wet, 21% clay, cohesive	SC	22	6	20.8	9.4E-06	~30
	8 - 9 feet	Clayey SAND, reddish-tan, wet, 30% clay, cohesive	SC	22	6	30.2	5.6E-06	~30
	14 - 15 feet	Clayey SAND, reddish-tan, wet, 18% clay, cohesive	SC			17.5		~30
	29 - 30 feet	Clayey SAND, reddish-tan, wet, 21% clay, cohesive	SC			20.9		~30
	39 - 40 feet	Clayey SAND, reddish-tan, wet, 33% clay, cohesive	SC			33.1		~30
	59 - 60 feet	Clayey SAND, reddish-tan, wet, 29% clay, cohesive	SC			28.5		~30
		Clayey SAND,						

Boring Number	Depth Below Grade	Stratum	USC Symbol	Liquid Limit*	Plasticity Index*	Percent Passing#200 Sieve	Permeability*	Percent Porosity*
	79 - 80 feet	reddish-tan, wet, 24% clay, cohesive	SC			24.1		~30
			Minimum Maximum Average	22 25 23.0	6 10 7.3	16.9 33.1 24	4.7E-06 9.4E-06 6.6E-06	~30 ~30 ~30
SITE E	0 - 5 feet	MINIMUM MAXIMUM AVERAGE		17 26 22.0	3 12 7.5	16.9 39.6 27.6	3.6E-06 1.7E-05 7.4E-06	30 30 30
OVERALL	5 - 10 feet	MINIMUM MAXIMUM AVERAGE		14 23 20.0	5 6 5.8	13.6 36.7 26.6	5.6E-06 1.5E-05 9.2E-06	30 30 30
	10 - 20 feet	MINIMUM MAXIMUM AVERAGE		15 15 15.0	Non-Plastic	5.0 34.6 18.2	1.4E-06 1.0E-05 5.7E-06	30 30 30
	20 - 30 feet	MINIMUM MAXIMUM AVERAGE		na na na	na na na	4.3 37.1 18.2	na na na	30 30 30
	30+ feet	MINIMUM MAXIMUM AVERAGE		na na na	na na na	10 33.1 22.5	na na na	30 30 30

Maximum depth: 136 feet below grade

2,346 feet above MSL

*For the major soil strata encountered, record the minimum, maximum, and average values of these parameters as applicable.

Table VI.A.4 - Waste Management Area Subsurface Conditions

Boring Number	Depth Below Grade	Stratum	USC Symbol	Liquid Limit*	Plasticity Index*	Percent Passing#200 Sieve	Permeability*	Percent Porosity*
Site E Testhole 1	2 - 3 feet	Clayey SAND, reddish tan, damp, 40% clay, cohesive	SC	24	8	39.6	6.7 E-06	30
	4 - 5 feet	Clayey SAND, reddish tan, damp, 21% clay, cohesive	SC	18	Non-PLastic	20.8	6.7E -06	30
	9 - 10 feet	Clayey SAND, reddish tan, damp, 32% clay, cohesive	SC	19	5	31.8	1.0 E-05	30
	12 - 13 feet	Clayey SAND, reddish tan, damp, 16% clay, loose	SC	15	Non-PLastic	15.6	1.0 E-05	30
	29 - 30 feet	Clayey SAND, reddish tan, damp, 10% clay, loose	SC			10.4		30
	39 - 40 feet	Clayey SAND, reddish tan, damp, 30% clay, cohesive	SC			29.8		30
	49 - 50 feet	Clayey SAND, reddish tan, damp, 12% clay, loose	SC			11.5		30
		Clayey SAND,						

Boring Number	Depth Below Grade	Stratum	USC Symbol	Liquid Limit*	Plasticity Index*	Percent Passing#200 Sieve	Permeability*	Percent Porosity*
	69 - 70 feet	reddish tan, damp, 19% clay, cohesive	SC			19.0		30
			Minimum Maximum Average	15 24 19	Non-Plastic 8 3.3	10.4 39.6 22.3	6.7 E-06 1.0 E-05 8.4 E-06	30 30 30

Maximum depth: 136 feet below grade

2,354 feet above MSL

*For the major soil strata encountered, record the minimum, maximum, and average values of these parameters as applicable.

Table VI.A.4 - Waste Management Area Subsurface Conditions

Boring Number	Depth Below Grade	Stratum	USC Symbol	Liquid Limit*	Plasticity Index*	Percent Passing#200 Sieve	Permeability*	Percent Porosity*
Site E Testhole 2	2 - 3 feet	Clayey SAND, reddish tan, damp, 32% clay, cohesive	SC	21	4	31.9	3.6 E-06	~30
	4 - 5 feet	Clayey SAND, reddish tan, damp, 20% clay, cohesive	SC	17	4	19.7	5.6 E-06	~30
	9 - 10 feet	Clayey SAND, reddish tan, damp, 14% clay, cohesive	SC	14	Non-Plastic	13.6	5.9 E-06	~30
	14 - 15 feet	SAND, course-grained with caliche nodules, reddish-tan, dry, loose	SP	15	Non-Plastic	5.0	1.4 E-06	~30
	29 - 30 feet	SAND, course-grained with caliche nodules, reddish-tan, dry, loose	SP			4.3		~30
	44 - 45 feet	Clayey SAND, reddish tan, damp, 25% clay, cohesive	SC			25.3		~30

Boring Number	Depth Below Grade	Stratum	USC Symbol	Liquid Limit*	Plasticity Index*	Percent Passing#200 Sieve	Permeability*	Percent Porosity*
	64 - 65 feet	Clayey SAND, course-grained with caliche nodules, reddish-tan, damp, slightly cohesive	SC			10.0		~30
	74 - 75 feet	Clayey SAND, reddish tan, damp, 26% clay, cohesive	SC			26.0		~30
			Minimum Maximum Averge	14 21 16.75	Non-Plastic 4 3.5	4.3 31.9 17.0	6.7 E-06 1.0 E-05 8.4 E-06	30 30 30

Maximum depth: 136 feet below grade

2,350 feet above MSL

*For the major soil strata encountered, record the minimum, maximum, and average values of these parameters as applicable.

Table VI.A.4 - Waste Management Area Subsurface Conditions

Boring Number	Depth Below Grade	Stratum	USC Symbol	Liquid Limit*	Plasticity Index*	Percent Passing#200 Sieve	Permeability*	Percent Porosity*
Site E Testhole 3	2 - 3 feet	Clayey SAND, reddish tan, damp, 37% clay, cohesive	SC	23	8	36.5	6.3 E-16	~30
	4 - 5 feet	Clayey SAND, reddish tan, damp, 28% clay, cohesive	SC	26	12	28.1	1.7 E-05	~30
	7 - 8 feet	Clayey SAND, reddish tan, damp, 37% clay, cohesive	SC	23	6	36.7	1.5 E-05	~30
	15 - 16 feet	Clayey SAND, reddish tan, damp, 35% clay, cohesive	SC			34.6		~30
	29 - 30 feet	Clayey SAND, reddish tan, damp, 37% clay, cohesive	SC			37.1		~30
	39 - 40 feet	Clayey SAND, reddish tan, damp, 37% clay, cohesive	SC			23.1		~30
	59 - 60 feet	Clayey SAND, reddish tan, damp, 20% clay, cohesive	SC			19.7		~30
		Clayey SAND,						

Boring Number	Depth Below Grade	Stratum	USC Symbol	Liquid Limit*	Plasticity Index*	Percent Passing#200 Sieve	Permeability*	Percent Porosity*
	79 - 80 feet	reddish tan, damp, 19% clay, cohesive	SC			19.4		~30
			Minimum Maximum Average	23 26 24	6 12 8.8	19.4 37.1 29.4	6.3 E-06 1.7 E-05 1.3 E-05	30 30 30

Maximum depth: 136 feet below grade

2,340 feet above MSL

*For the major soil strata encountered, record the minimum, maximum, and average values of these parameters as applicable.

Table VI.B.3.b. - Unit Groundwater Detection Monitoring Systems

SITE H LTU				
Well Number(s)	MW-52	MW-52A	MW-53	MW-53A
Hydrogeologic Unit Monitored	Upper Sand	Basal Gravel	Upper Sand	Basal Gravel
Type (e.g., point of compliance, background, observation, etc.)	Background	Background	Background	Background
Up or Down Gradient	Up	Up	Up	Up
Casing Diameter and Material	2-inch PVC	2-inch PVC	2-inch PVC	2-inch PVC
Screen Diameter and Material	2-inch PVC	2-inch PVC	2-inch PVC	2-inch PVC
Screen Slot Size (in.)	0.020	0.020	0.020	0.020
Top of Casing Elevation (Ft, MLGL or MSL)	2517.86	2517.82	2511.27	2511.12
Grade or Surface Elevation (Ft, MLGL or MSL)	2515.10	2515.08	2508.11	2507.99
Well Depth (Ft, Below Grade Surface *[BGS]*)	125.0	157.0	112.8	133.9
Well Depth (Ft, Below Top of Casing *[BTOC]*)	127.8	159.7	116.0	137.0
Screen Interval				
From(Ft, BGS)	105.0	137.0	92.8	113.9
To(Ft, BGS)	125.0	157.0	112.8	133.9
Screen Interval				
From(Ft, bTOC)	107.8	139.7	96.0	117.0
To(Ft, bTOC)	127.8	159.7	116.0	137.0
Facility Coordinates (e.g., lat./long. or company coordinates) (ex. 99° 99' 99"}	N 247820.4 E 790138.4	N 247818.2 E 790127.3	N 247196.8 E 790619.6	N 247195.7 E 790608.5

SITE H LTU

Well Number(s)	MW-54	MW-54A	MW-74	MW-74A
Hydrogeologic Unit Monitored	Upper Sand	Basal Gravel	Upper Sand	Basal Gravel
Type (e.g., point of compliance, background, observation, etc.)	POC	POC	POC	POC
Up or Down Gradient	Down	Down	Down	Down
Casing Diameter and Material	2-inch / PVC	2-inch / PVC	2-inch / PVC	2-inch / PVC
Screen Diameter and Material	2-inch / PVC	2-inch / PVC	2-inch / PVC	2-inch / PVC
Screen Slot Size (in.)	0.020-inch	0.020-inch	0.020-inch	0.020-inch
Top of Casing Elevation (Ft, MLGL or MSL)	2506.96	2507.27	2509.55	2509.54
Grade or Surface Elevation (Ft, MLGL or MSL)	2505.16	2505.31	2506.61	2506.54
Well Depth (Ft, Below Grade Surface *[BGS]*)	116.7	136.0	111.1	143.0
Well Depth (Ft, Below Top of Casing *[BTOC]*)	118.5	138.0	114.0	146.0
Screen Interval				
From(Ft, BGS)	96.7	116.0	91.1	123.0
To(Ft, BGS)	116.7	136.0	111.1	143.0
Screen Interval				
From(Ft, bTOC)	98.5	118.0	94.0	126.0
To(Ft, bTOC)	118.5	138.0	114.0	146.0
Facility Coordinates (e.g., lat./long. or company coordinates) (ex. 99° 99' 99"}	N 247067.6 E 790035.9	N 247060.3 E 790053.3	N 247164.6 E 790468.0	N 247160.3 E 790458.6

SITE H LTU				
Well Number(s)	MW-75	MW-75A	MW-76	MW-76A
Hydrogeologic Unit Monitored	Upper Sand	Basal Gravel	Upper Sand	Basal Gravel

Type (e.g., point of compliance, background, observation, etc.)	POC	POC	Background	Background
Up or Down Gradient	Down	Down	Up	Up
Casing Diameter and Material	2-inch / PVC	2-inch / PVC	2-inch / PVC	2-inch / PVC
Screen Diameter and Material	2-inch / PVC	2-inch / PVC	2-inch / PVC	2-inch / PVC
Screen Slot Size (in.)	0.020-inch	0.020-inch	0.020-inch	0.020-inch
Top of Casing Elevation (Ft, MLGL or MSL)	2508.38	2508.38	2522.21	2521.89
Grade or Surface Elevation (Ft, MLGL or MSL)	2506.66	2506.65	2519.40	2518.99
Well Depth (Ft, Below Grade Surface *[BGS]*)	113.3	153.3	120.0	158.0
Well Depth (Ft, Below Top of Casing *[BTOC]*)	115.0	155.0	122.8	160.9
Screen Interval				
From(Ft, BGS)	93.3	133.3	100.0	138.0
To(Ft, BGS)	113.3	153.3	120.0	158.0
Screen Interval				
From(Ft, bTOC)	95.0	135.0	102.8	140.9
To(Ft, bTOC)	115.0	155.0	122.8	160.9
Facility Coordinates (e.g., lat./long. or company coordinates) (ex. 99° 99' 99"}	N 247088.8 E 790222.1	N 247091.9 E 790230.2	N 247976.0 E 790629.8	N 247974.8 E 790620.7

SITE H LTU				
Well Number(s)	MW-77	MW-77A		
Hydrogeologic Unit Monitored	Upper Sand	Basal Gravel		
Type (e.g., point of compliance, background, observation, etc.)	POC	POC		
Up or Down Gradient	Down	Down		

Casing Diameter and Material	2-inch / PVC	2-inch / PVC		
Screen Diameter and Material	2-inch / PVC	2-inch / PVC		
Screen Slot Size (in.)	0.020-inch	0.020-inch		
Top of Casing Elevation (Ft, MLGL or MSL)	2511.59	2511.86		
Grade or Surface Elevation (Ft, MLGL or MSL)	2508.77	2508.99		
Well Depth (Ft, Below Grade Surface *[BGS]*)	117.2	147.1		
Well Depth (Ft, Below Top of Casing *[BTOC]*)	120.0	150.0		
Screen Interval				
From(Ft, BGS)	97.2	127.1		
To(Ft, BGS)	117.2	147.1		
Screen Interval				
From(Ft, bTOC)	100.0	130.0		
To(Ft, bTOC)	120.0	150.0		
Facility Coordinates (e.g., lat./long. or company coordinates) (ex. 99° 99' 99"}	N 247474.5 E 790109.5	N 247481.8 E 790113.4		

[1]From Tables in Section V.
MSL: Mean Sea Level; *MLGL*: Mean Low-tide Gulf Level; *BGS*: Below Grade Surface; *BTOC*: Below Top of Casing

Table VI.B.3.c. - Groundwater Detection Monitoring Parameters

Unit/Waste Management Area SITE H LTU

Well No(s): MW-52, MW-52A, MW-53, MW-53A, MW-54, MW-54A, MW-74, MW-74A, MW-75, MW-73A, MW-76, MW-76A,

Parameter	Sampling Frequency	Analytical Method	Method Detection Limit (MDL) or Method Quantification Limit (MQL) Value, (units), MDL or MQL[2]	Concentration Limit[1]
		Method listed below or currently accepted method		
Arsenic	Annual	SW846 - 6020A	MQL 0.005 mg/l	0.014 mg/l
Chromium, total	Annual	SW846 – 6020A	MQL 0.005 mg/l	0.026 mg/l
Lead	Annual	SW846 – 6020A	MQL 0.005 mg/l	0.01 mg/l
Selenium	Annual	SW846 – 6020A	MQL 0.025 mg/l	0.1 mg/l
Benzene	Annual	SW846 – 8260B	MQL 0.001 mg/l	0.002 mg/l
Toluene	Annual	SW846 – 8260B	MQL 0.001 mg/l	0.002 mg/l
Phenolcs	Annual	EPA 420.1	MQL 0.005 mg/l	0.015 mg/l
If a Potential SSI is determinde, the well will be re-sampled for the Skinner List Constituents.	The Skinner List Constituents are identified in Attachment VI, Geology Report, Table VI.B.3.c{2}			

1. The concentration limit is the basis for determining whether a release has occurred from the waste management unit/area.
2. a. Enter the laboratory expected *Method Detection Limit* if determination of *Statistically Significant Increase* (SSI) occurrence is based on detection of the presence of the constituent of concern in the sample.
3. b. Enter the laboratory expected Method Quantification Limit if determination of SSI is based on statistical analysis of detection monitoring data or direct comparison to a limit value.

This should be based on the laboratory's minimum expected level of performance. Please designate which type of limit has been entered for each constituent, with its value and units.

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Alon USA Big Spring Refinery
Big Spring, TX

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APPENDIX VI.A.
GEOLOGY REPORT

Alon USA Big Spring Refinery

Compliance Plan CP-50140

Attachment VI
Geology Report
SWR No. 30083 / RN100250869 / CN600881783

Alon USA Big Spring Refinery - Big Spring, Texas

April 5, 2024

Robert L. Sherrill, PG
Geologist

Signature

Texas PG-120
Registration Number & State

Atlas Technical Consultants, LLC
TX#56038
Texas Geoscience Firm & Registration Number

January ___, 2024
Date

Professional Seal

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SECTION 1 VI.A GEOLOGY AND TOPOGRAPHY

VI.A.1.a (1) Active Geologic Processes

Geologic and geomorphic processes applicable to, but of only minor importance, in the areas surrounding the refinery are (1) channeling and gullying, and (2) minimal overland flow.

Channeling and gullying are commonly associated with areas with little to moderate vegetative ground cover and/or sandy soil exposure. The relatively flat to gently sloping topography, the arid to semi-arid climatic conditions, and man-made diversion systems combine to minimize the effects of channeling and gullying outside of naturally occurring flow systems at the site.

Since the area is normally covered by wind-borne sand and silt, overland flow is minimized but can occur from the area surrounding the units during times of intense rainfall. However, the high net evaporated water balance in the area surrounding the units reduces runoff to an estimated two inches per year. Additionally, sheet flow of surface runoff is retained on the Site H LTU, Site E LTU, and the Container Storage Area (CSA) by man-made berms.

Development of sinkholes, regionally, is associated with the Edwards Formation and associated limestone in the Odessa area located approximately 60 miles to the southwest. Since these units do not outcrop at the refinery, nor do they underlie the site, subsidence associated with them will not affect the regulated units.

Erosion due to fluvial processes is a potential geologic hazard in floodplain areas adjacent to rivers or streams. The Big Spring refinery is adjacent to Big Sandy Creek to the northwest and Beals Creek to the south. Although short-term, localized flooding may occur during intense rain events at these streams, Big Sandy Creek has a very narrow flood plain since it runs through an erosional stream bed 44-feet below the facility located on the bluff above the stream and Beals Creek is located to the south of the facility 19 feet lower than the elevation of the southern property line in an area that drains towards the south and southeast.

VI.A.1.a (2) Descriptions and Maps of Faulting, Fracturing, and Lineations

Based on literature searches, review of geologic maps, and the evaluation of aerial photos and facility borings, there is no evidence of faulting on, or in the vicinity of the facility. Figure VI.A.1.a(1), *Major Geologic Information*, is a Regional Geologic Map of the facility area. No fault lines are indicated.

Owing to the nature of the near surface lithology (Eolian silt and sand, Ogallala sand, and Dockum clay), fracturing of the geologic units would be very unlikely.

Lineations have been identified in Howard County (Finley, Robert J. and Thomas Gustavson, *Lineament Analysis Based on Landsat Imagery, Texas Panhandle*, 1981; Bureau of Economic Geology, University of Texas at Austin, Geological Circular 81-5, 38 pgs). Figure VI.A.1.a(2), *Location of Faulting, Fracturing, & Lineations in Howard County,* indicates the locations of lineations located in Howard County from both the literature and aerial photograph evaluation by the author. The lineations nearest the facility are located approximately 2 miles to the north and northeast. No evidence of lineations at the facility could be identified.

VI.A.1.a (3) Maps and Cross-Sections

Figure VI.A.4.b (Sheets 1 through 14) presents cross-sections prepared from the facility information. Figure VI.B.2.c Sheets 1 and 2 are isocontour maps of paleotopography of the top of the Ogallala Basal Gravels and the Dockum Formation, respectively.

VI.A.1.a (4) Area Cross-Sections

See Figure VI.A.1.a(3), Sheets 1 through 8 for regional cross sections. Table VI.A.3.b(1) is the localized Stratigraphic Column at the Facility and Figure VI.A.1.a(4) is the Regional Stratigraphic Column at Big Spring, Texas.

VI.A.1.a (5) Subsurface Structure Maps

See Figure VI.B.2.c Sheet 1 (*Paleotopographic Map of Top of Ogallala FM Basal Gravel Unit*) and Sheet 2 (*Paleotopographic Map of Top of Dockum FM Red-Bed Clay*)

VI.A.1.a (6) Field Surveillance

Historically, the author has conducted numerous field surveys for the purpose of identifying existing geological and geomorphological features at and around the facility. The findings of these surveys have been:

Faulting – no evidence of faulting has been identified either at the surface or in the near-surface on or in the immediate area of the facility.

Lineations – no lineations have been identified that were naturally occurring. Numerous below-grade pipelines have exhibited the appearance of lineations but where systematically eliminated from consideration.

Erosional Features – wind and water erosional features of significance and isolated migrating dunes are located in the northwest corner of the property associated with Sandy Draw and along the southwestern property line (south of IH-20) associated with Sulfur Draw.

Surface Extent of Ogallala Formation – the surface outcrop of the Dockum Formation (terminus of the Ogallala Formation and Ogallala Aquifer) has been identified 0.5 to 0.8 miles south of the facility property line.

VI.A.1.a (7) Other Support Maps and Figures

Other supporting maps would include:

- Figure VI.A.1.a(7) Sheet 1 – Potentiometric Map July 2020
- Figure VI.A.1.a(7) Sheet 2 – Potentiometric Map July 2021
- Figure VI.A.1.a(7) Sheet 3 – Potentiometric Map July 2022
- Figure VI.A.1.a(7) Sheet 4 – Magnetic Map of Big Spring, Texas Area

VI.A.1.a (8) Faulting

No faulting identified within 3000-feet of any surface units.

VI.A.1.a (9) Active Faulting

No faulting identified within 3000-feet of any surface units.

VI.A.1.b Land Surface Subsidence

No surface subsidence identified in Howard County

VI.A.1.c Erosion and Channeling

Wind and water erosion associated with Sandy Draw (containing Big Sandy Creek) in the northwest corner of the property occurs with seasonal rainfall and along the southwestern property line (south of IH-20) associated with Sulfur Draw. Neither of these two primary erosional areas have any effect on the units. Across the entire facility, non-paved or graveled areas are subject to overland flow water erosion and wind erosion during extreme rain events. No significant erosion in the area of the units has been observed (Figure VI.A.1.c., Topographic Map with Erosion Areas Designated).

VI.A.1.d Table VIA.1 – Major Geologic Formations

See Table VI.A.1. located both in Permit Application and attached.

VI.A.2.a Distance and Direction To Nearest Surface Water Body

The nearest surface water bodies to units (at a lower elevation) Site H LTU and Site E LTU are (1) WP-6, an on-site wastewater impoundment, and (2) Beals Creek, a hyper-saline stream located approximately 800-feet south of the southern property boundary. The distances and directions are as follows:

Site H to WP-6	7,960-feet to the south
Site H to Beals Creek	10,500-feet to the south
Site E to WP-6	3,440-feet to the south
Site E to Beals Creek	5,990-feet to the south

VI.A.2.b Slope of Land Surface

Maximum Grade Elevation	2,541.64-feet mean sea level
Minimum Grade Elevation	2,365.99-feet mean sea level
Elevation Difference	175.65-feet
Linear Distance	10,500-feet
Slope of Land Surface	0.02 feet per foot or 2% slope

VI.A.2.c Direction of Slope

The grade surface slopes from the extreme northern boundary (highest elevations) to the extreme southern boundary (lowest elevations).

VI.A.2.d Maximum Elevation of Facility

Based on over 500 grade elevation survey points within the facility, the maximum elevation identified is: 2,541.64 feet above mean sea level. This elevation is located in the northern boundary area of the facility northwest of Site H.

VI.A.2.e Minimum Elevation of Facility

Based on over 500 grade elevation survey point within the facility, the minimum elevation identified is: 2,365.99 feet above mean sea level. This elevation is located in the southern boundary area of the facility just north of Beals Creek.

VI.A.3.a Regional Geology – Geologic Map

See Figure VI.A.1.a(1), Sheets 1 and 2 for Regional Geologic Map. A description of the regional lithology (from youngest to oldest) is as follows:

- Alluvium (Qal) – Holocene age floodplain deposits, including low terrace deposits near floodplain.
- Windblown Sand (Qs, Qsd, Qsu) – Holocene age sand and silt in sheets of cover sand (Qs), sand dunes and dune ridges (Qsd), and areas of sand sheets, dunes, and dune ridges undivided (Qsu).
- Quaternary age deposits undivided (Qau) – intermixed deposits of associated alluvium clay, silt, sand, and gravel in dissected areas.
- Fluviatile terrace Deposits (Qt) – Pleistocene age silts, sands, and gravels. Gravels with pebbles and cobbles of chert, quartzite, igneous rock, metamorphic rock, caliche, and, at higher levels, abraded Gryphaea; quartz sand, crossbedded to massive, lenticular; reddish brown, pink, gray to light gray.
- Playa and Pond Deposits (Qp, Qun) – Pleistocene age, Playa deposits (Qp) of clay, silt, sand. Light gray, in shallow depressions, usually covered by thin deposit of Recent sediment. Pond Deposits (Qun) of gastropod-bearing sandy silt and silty clay, gray to light gray, deposited in ponds and shallow swales, locally may include Tahoka deposits.
- Seymour Formation and other Quaternary Deposits (Qs, Qao) – Pleistocene age sands gravels and clay in thin to thick deposits (1 to 40-feet) and deposits of limestone gravels. The Quaternary Deposits (Qao) are west of the area of the Seymour Formation and include mostly pebbles from Cretaceous outcrops, angular to moderately well-rounded, calcite cement, deposited by high-gradient streams.
- Tahoka Formation (Qta) – Pleistocene age with thickness of up to 75-feet. Lacustrine clay, silt, sand, and gravel locally calcareous and selenitic. Clay and silt, sandy and indistinctly bedded to massive, weakly coherent, various shades of light gray and bluish gray. Sand is fine to coarse-grained quartz, indistinctly bedded to massive, friable, gray, at margins of deposits that grade to gravel.

- Windblown Cover Sand (Qcs) – Lower Pleistocene age with thickness of up to 25-feet. Fine to medium grained quartz sand, silty, calcareous, with caliche nodules. Massive grayish red with a distinct soil profiles.
- Quaternary and Tertiary Deposits Undivided (QT) – Upper Pliocene age with wide range of thickness. Pleistocene gravels, sand, and silt. Gravels mostly limestone with caliche and siliceous pebbles. Sand and silt mostly brown, brownish gray, and gray grains of silica and calcium carbonate.
- Ogallala Formation (To) – Lower Pliocene age with thickness of up to 175-feet. Fluviatile and, silt, clay and gravel capped in places by caliche. Sand is fine to medium grained quartz in parts silty and calcareous, clayey in upper part, clay balls, indistinctly bedded in massive crossbedded, unconsolidated to weakly cohesive, local quartzite lenses, reddish pink. Gravel in isolated areas, mostly quartz, some quartzite in transformational channel deposits and in basal conglomerates.

Erosional Unconformity – Missing Units

- Edwards Limestone (Ke) – Lower Cretaceous age, 150-170-feet thick. Fine to coarse grained, thick bedded to massive, minor thin marly nodular limestone beds, locally dolomitic with chert, light gray to grayish yellow.
- Comanche Peak Limestone (Kc) - Lower Cretaceous age, 35-feet thick. Argillaceous, thin shale interbeds, irregularly bedded and nodular to thick bedded. Light gray, grayish yellow, yellowish brown.
- Walnut Formation (Kw) - Lower Cretaceous age, 20-feet thick. Interbedded shale, limestone, and marl. Shale is sandy in part, thin bedded, light to dark gray, grayish yellow. Limestone is sandy, argillaceous, nodular, light gray, yellowish gray, grayish yellow. Marl is sandy in part, thin bedded, yellow.
- Antlers Sand ((Ka) - Lower Cretaceous age, 25 to 100-feet thick. Sand, sandstone, conglomerate, siltstone, and locally quartzite. Sand, sandstone, and quartzite are fine to coarse-grained quartz, locally argillaceous, poorly bedded, moderately indurated to friable, white, brown, light gray, grayish yellow, pale purple. Conglomerate is a basal unit of white and pink quartz, black chert, and clay pebbles with interbeds of coarse sand, ferruginous to slightly calcareous. Siltstone in thin gray and pink beds.
- Fort Terrett Formation (Kft) - Lower Cretaceous age, 130+-feet thick. Cherty limestone and dolomite. Light to dark gray limestone with medium brownish-gray dolomite in lower part.

Erosional Unconformity – Existing Units

- Dockum Group (TRd) – Triassic, 450-feet thick. Clay, shale, sandstone, and conglomerates. Sandstone is fine to coarse-grained quartz, micaceous, silty, thin bedded to massive, cross bedded, well indurated, greenish gray to brownish red. Clay is massive and reddish brown. Shale is sandy and locally calcareous with various shades of red, green, gray, and yellow. Conglomerate is of various colored chert pebbles common in lower part.
- Quartermaster Formation (Pq) – Permian, 450-feet thick. Shale, siltstone, sandstone, gypsum, and dolomite interbedded in 2 to 4 inch units in mostly shades of red.

- Whitehorse Sandstone and Cloud Chief Gypsum undivided (Pwh) – Permian, 650-feet thick. Sandstone, sand, shale, gypsum, selenite, and dolomite interbedded in thin to thick (inches to 12-feet) units. Various shades of red and mottled grayish green.
- Blaine Formation (Pb) – Permian, 450-feet thick. Shale, sandstone, gypsum, selenite, and dolomite interbedded. Shale is silty and in pert calcareous, selenitic, in part very thin bedded in mostly indistinctive units. Various shades of gray, green, and red.

VI.A.3.b Regional Geology – Stratigraphic Column

See Table VI.A.3.b(1) and Figure VI.A.1.a.(4)

VI.A.4 Subsurface Soils Investigation Report

VI.A.4.a Logs of Borings – Waste Management Areas

See Attachment VI.B.4.a for Site E boring and well logs and Attachment VI.B.3.d for Site H boring and well logs.

VI.A.4.b Cross-Sections – Waste Management Area

See Figure VI.A.4.b, Sheets 1 through 13 for localized cross-section through the waste management areas.

VI.A.4.c Description of Soil Stratigraphy

SWMU	Eolian FM	Ogallala FM (Sand)	Ogallala FM (Gravel)	Dockum FM
Site H	ML-SM – silt and very fine sand, loose to compact, orange to red, dry Thickness – 0.0 to 16.0 feet, average 6.2-feet	SP – uniform fine grained, loose, light red and orange, dry until top saturation, damp vadose zone of 1 to 2 feet. Isolated thin layers of calcareous nodules near water table. Thickness – 86.0 to 147.0 feet, average 121.9 feet	GP – poorly graded with 10 to 20% fine to medium sand, rounded to sub-rounded chert and calcareous medium gravel, loose, red, saturated. Isolated "False Red Bed" clay layers, soft, red, saturated. Thickness – 2.0 to 38.0 feet, average 18.0 feet	CH – highly plastic, massive, dense, red clay, damp to moist. Partial penetrated through top 24-feet. Literature indicates thickness of ~450-feet.

SWMU	Eolian FM	Ogallala FM (Sand)	Ogallala FM (Gravel)	Dockum FM
Site E	Not Present	SP – uniform fine grained, loose, light red and orange with zones of gray, dry until top saturation, damp vadose zone of 1 to 3 feet. Isolated pockets of calcareous nodules near water table. Thickness – 106.0 to 129.0 feet, average 113.4 feet	GP – poorly graded with 10 to 20% fine sand, sub-rounded chert and calcareous medium gravel, loose, red, saturated. Thickness – 19.5 to 34.0 feet, average 26.8 feet	CH – highly plastic, dense, red clay, damp to moist. Partial penetrated 16-feet. Literature indicates thickness of ~450-feet.
BICA	SM – Silty sand, sand very fine, some areas with 2-3% clay particles, mostly calcareous and fractured quartz, loose, tan to orange, dry. Thickness (North) – 0.0 to 20.0 feet, average 8.7 feet Thickness (South) – 0.0 to 11.0 feet, average 5.1 feet	SP – uniform fine grained, loose to compact, brick red, tan, and orange, dry until top saturation, damp vadose zone of 2 to 6 feet. Isolated layers and pockets of calcareous nodules and cementation near water table. Thickness (North) – 97.0.0 to 141.0 feet, average 123.2 feet Thickness (South) – 16.0 to 102.0 feet, average 74.9 feet	GP – poorly graded with 6 to 20% fine sand, subangular to round chert and calcareous fine to medium gravel, loose, red, saturated. Thickness (North) – 0 to 20.0 feet, average 7.0 feet Thickness (South) – 1.0 to 28.0 feet, average 8.1 feet	CH – highly plastic, dense, red clay, damp to moist. Partial penetrated 38-feet. Literature indicates thickness of ~450-feet.

VI.A.4.d Table VI.A.4 – Waste Management Area Subsurface Conditions

See Table VI.A.4

Eolian Formation Silt and Sand:

- Liquid Limit: Max. = 26% Min. = 21% Avg. = 23.8%
- Plastic Limit: Max. = 14% Min. = non-plastic Avg. = 8.8%
- % Passing -200 sieve: Max. = 39.6% Min. = 16.9% Avg. = 30.6%
- Permeability (cm/sec): Max. = $1.7x10^{-5}$ Min. = $3.6x10^{-6}$ Avg. = $7.7x10^{-6}$

Ogallala Formation Sand:

- Liquid Limit: Max. = 24% Min. = 14% Avg. = 18.9%
- Plastic Limit: Max. = 8% Min. = non-plastic Avg. = 5.7%
- % Passing -200 sieve: Max. = 39.6% Min. =4.3 % Avg. = 22.4%
- Permeability (cm/sec): Max. = $1.5x10^{-5}$ Min. = $1.4x10^{-6}$ Avg. = $7.7x10^{-6}$

VI.A.4.e Land Treatment Unit Surficial Soils

Site H – A constructed land treatment unit meeting the minimum technology design criteria. Native soils are not in contact with the waste and as such, are of no consequence. The treatment zone is constructed of re-compacted Dockum formation clay transported in from offsite. Underlying the treatment zone is the leachate collection grid with an underlying plastic geomembrane liner.

Site E – Located entirely on the Springer Loamy fine sand, undulating (Sr) (see Figure VI.A.4.e, *Map of Soil Types – Big Spring, Texas*). This undulating soil is in broad upland areas with slopes of 0 to 1 percent. The surface layer is dark-brown fine sandy loam about 12 inches thick. The subsoil is primarily fine sandy loam about 36 inches thick. A layer of weak accumulated lime occurs about 48 inches below the surface. For a summary of the soil properties for all the soils identified at the facility, see Table VI.A.4.e. (*Soil Properties*).

SECTION 2 VI.B FACILITY GROUNDWATER

VI.B.1 Regional Aquifers

a. The regional aquifer in the Big Spring area is the Ogallala Aquifer which is contained in the lower part of the Ogallala formation sands and basal gravel (see Table VI.A.3.b(1)).

b. medium quartz sands. Below these sands is the Ogallala basal gravel which consists of fine to medium chert gravels with intermixed fine to medium quartz sand.

c. Owing to the coarse-grained material that makes up the Ogallala aquifer, the formation is moderately transmissive with hydraulic conductivities, based on facility production testing, ranging from 322 to 1200 gallons per day per foot2 (gpd/ft2). Across the facility, transmissivities average 8,346 gallons per day per foot (gpd/ft) in the saturated sands and 15,856 gpd/ft in the basal gravels.

d. At the facility, the Ogallala appears to be under water table conditions although the differential transmissivities between the sands and gravels induce a slight, upward head difference between paired wells.

e. The sands and the gravels are hydraulically connected with no identified fine-grain lithologic separator.

f. Figure VI.B.1.f is a regional potentiometric map and aquifer thickness map for the Ogallala aquifer in the High Plains.

g. Across the Facility, 62 calculated groundwater flow rates from levels measured since 1992 indicate a flow rate in the saturated sands of 144.5 feet per year (ft/yr) to 302.8.0 ft/yr with a historical average of 193.7 ft/yr. Flow gradients range from 0.0025 feet/foot (ft/ft) to 0.0052 ft/ft with a historical average of 0.0033 ft/ft. In the basal gravels, flow rates range from 331.2 ft/yr to 844.7 ft/yr with a historical average of 519.7 ft/yr. Flow gradients range from 0.0021 ft/ft to 0.0053 ft/ft with a historical average of 0.0032 ft/ft. See Table VI.B.2.e., Historical Aquifer Flow Characteristics.

In wells screened across both the sand and gravel, approximately 85% of the production is from the gravel unit.

h. Total Dissolved Solids (TDS) for upper saturated Sands – Maximum = 55,000 mg/L, Minimum = 196 mg/L, Average = 5,082 mg/L. TDS for lower basal Gravels – Maximum = 200,000 mg/L, Minimum = 330 mg/L, Average = 14,384 mg/L. The TDS increases in a southward direction due to the recharge of saline water from Beals Creek as well as the flow terminus of the Ogallala Aquifer approximately 800-feet to the south of the property creating highly mineralized conditions.

i. Recharge occurs from streams and direct precipitation along the outcrop of the Ogallala Formation. Figure VI.B.1.i is a map showing the regional recharge area. Primary recharge at the Alon facility comes from Beals Creek, seasonal flow in Sandy Draw, and direct precipitation in unpaved/unlined portions of the facility.

j. The City of Big Spring and the surrounding area utilize surface water for potable water needs due to the high salinity and mineral content of the area groundwater. The Ogallala aquifer in the Big Spring area is utilized for agricultural and livestock needs.

VI.B.2 Groundwater Conditions – Waste Management Units

VI.B.2a Historic Water Levels in Borings

See Table VI.B.2.a. for top of saturation and water level comparison.

VI.B.2b Historic Water Levels in Monitor Wells

See Table VI.B.2.b for historic water levels and calculations of maximum and minimum water levels since 2014.

VI.B.2c Interconnected Units

See Table VI.B.2.c. – Upper and Lower Limits of the Ogallala Aquifer

See Figures VI.B.2.c. – Isocontour Map of top of Ogallala FM Basal Gravel Unit (Sheet 1) and Isocontour Map of Top of Dockum FM Red-Bed Clay (Sheet 2)

See Figure VI.B.2.d – Potentiometric Map of Water Levels and Net-Thickness Map of LNAPL, July 2023.

The average upper and lower limits of the Ogallala aquifer at the solid waste management units are:

Unit	Upper Limit ft-MSL	Lower Limit ft-MSL	Thickness feet
BICA Area	2382.2	2348.5	33.7
Container Storage Area	2404.8	2354.3	50.5
Site E LTU	2397.2	2353.3	43.9
Site H LTU	2409.7	2361.4	48.3

VI.B.2d Potentiometric Surface

See Figure VI.B.2.d – Potentiometric Map of Water Levels and Net-Thickness Map of LNAPL, July 2023

VI.B.2e Hydraulic Gradient Variations

See Table VI.B.2.e. – Historic Aquifer Flow Characteristics

Across the facility, based on 62 facility-wide water level measurement events between October 1992 and January 2024, the flow gradient in the Ogallala upper saturated sands has varied from a maximum of 0.0052 feet per foot (ft/ft) to a minimum of 0.0025 ft/ft with a historical average of 0.0033 ft/ft. This has resulted in calculated

flow velocities of a maximum of 302.8 ft/yr to a minimum of 144.5 ft/yr with a historical average of 193.7 ft/yr.

The flow gradient in the Ogallala basal gravels has varied from a maximum of 0.0053 ft/ft to a minimum of 0.0021 ft/ft with a historical average of 0.0032 ft/ft. This has resulted in calculated flow velocities of a maximum of 844.7 ft/yr to a minimum of 331.2 ft/yr with a historical average of 519.7 ft/yr.

Natural or static flow direction (without the influence of the facility recovery system) is to the south with seasonal variations of up to 8o to the south-southeast.

VI.B.2f Predicted Migration Pathway(s)

A release from a land-based unit would result in migration downward through the unsaturated Ogallala FM sand to the top of the saturated Ogallala FM. Movement would then be to south along the gradient flow path. Below is a summary of the potential flow-path distances from each of the land-based units:

Unit	Distance to Top of Saturation	Distance Down-gradient to Intercept Recovery System	Distance Down-gradient to nearest Property Boundary
Site H LTU	100-ft	6,613-ft	9,521-ft
Site E LTU	89-ft	2,100-ft	5,145-ft
Container Storage Area	95-ft	4,630-ft	7,770-ft

VI.B.3 Description of the Detection Monitoring Program

BICA Area - Not applicable, in corrective action monitoring under CP-50140.

Site E LTU - Not applicable, in corrective action monitoring under CP-50140

Container Storage Area – Not applicable

Site H LTU - Post-Closure Detection Monitoring

VI.B.3.a Monitoring System Design

Parameter Justification – Attachment VI.B.3.a contains a copy of the background concentration study to determine background values (i.e., concentration limits) approved by the TCEQ.

Detection Monitoring System – The system will remain unchanged from the current system utilized under the 2014 permit HW-50140. The detection monitoring system for the Site H LTU is comprised of two upgradient well clusters and five-point of compliance (downgradient) well clusters located in accordance with Provision III.I.1.b. and Attachment G of the 2014 Permit HW-50140 (HW-50140 [2014]). In addition, cluster monitor wells MW-34/34A may be utilized as supplemental downgradient wells

only in the event that a statistical increase over background attributed to the Site H LTU is determined for a detection monitoring parameter (as per Provision III.I.1.l. of HW-50140 [2001]). Each well cluster consist of a deep well (designated in all cases with the letter "A" after the well number) screening the Ogallala FM basal gravel and a shallow well (no letter designation) screening the Ogallala saturated sand.

The upgradient monitor wells include (see Figure VI.B.3.e, Sheet 6 for location map):

- MWs-52/52A Northeast of the northwest corner of the Site H LTU; and
- 76/76A Northeast of the northeast corner of the Site H LTU

The point of compliance (downgradient) monitor wells include (see Figure VI.B.3.e, Sheet 6 for location map):

- MWs-53/53A Near the southeast corner of the Site H LTU
- MW-54/54A Near the southwest corner of the storm water collection pond (SCP;
- MWs-74/74A Due south of the Site H LTU
- MWs-75/75A Near the southwest corner of the Site H LTU; and
- MWs-77/77A West of the Site H LTU at the northeast corner of the SCP

The supplemental downgradient monitor wells include (see Figure VI.B.3.e, Sheet 6 for location map):

- MWs-34/34A Southeast of the southwest corner of the Site H LTU

The detection monitoring system wells identified above have been installed in accordance with the general design and construction requirements outlined in Attachment B of Permit Application Section XI. Well construction and lithologic logs are located in Attachment VI.B.3.d.

Sample Analysis - The analysis will remain unchanged from the current analytical testing performed under the 2014 permit HW-50140. The laboratory analysis to be performed on each of the upgradient and point of compliance wells is as follows:

Parameter	Method (SW-846)	Background Value	Holding Time
Benzene	8260B	0.002 mg/L	14 days
Toluene	8260B	0.002 mg/L	14 days
Phenolics	9065	0.015 mg/L	28 days
Arsenic	6020A	0.014 mg/L	180 days
Selenium	6020A	0.1 mg/L	180 days
Lead	6020A	0.01 mg/L	180 days
Chromium	6020A	0.026 mg/L	180 days

In addition, field blank (FB) samples will be prepared in the field at a rate of one per 10 groundwater samples and will be submitted to the laboratory for analysis of all the above parameters. A duplicate (DUP) sample will be collected along with the detection sample at a rate of one per 10 groundwater samples (excluding the DUP) and will be analyzed for all of the above parameters. A trip blank (TB) sample will be prepared by the third party laboratory at a rate of one per shipping container and will accompany the samples to and from the field for analysis of volatile organics only.

Sampling Method – All Site H wells will be sampled utilizing Low-Flow Purge and Sample methodology as per EPA guidance document 540/S-95/504. Groundwater samples collected using low-flow purging are carefully screened for specific field parameters until those parameters fall within specific stabilized conditions. At that time, the samples are collected. All measurements are made in-situ to preserve redox integrity. The instrument used for the readings is the HydroLab® or an equivalent instrument.

As purging progresses, groundwater is analyzed in-situ for dissolved oxygen, pH, oxidation-reduction potential (ORP), temperature and specific conductance with the field instrument. For each well, a dedicated pump and dedicated Tygon tubing will be utilized. A new set of disposable nitrile gloves will be dedicated in order to reduce the possibility of cross contamination. Water will be removed from the screened interval of each well using the dedicated pneumatic pump set on low-flow (i.e., less than 0.8 gpm) which will cause minimal disturbance of in-situ conditions. Groundwater flow will be directed from this in-situ starting point to a flow-through cell located at the ground surface without ambient air contact. The flow-through cell will be attached to a multi-functional probe, which measures the parameters of pH, Eh, dissolved oxygen, temperature and specific conductance. The parameter probe will be calibrated prior to use according to the manufacturer's standards (see Attachment CP SAP-A for the calibration record form that is part of the log book).

During the low-flow purging and sampling process, the groundwater wells will be pumped at a low rate that will create a minimum of drawdown as technically possible for the permeability of the formation. All sampled wells will be purged with readings recorded roughly every 5 minutes until field parameters are stabilized for three consecutive readings to at least the following criteria:

- for pH, 3% for specific conductance,
- 10 millivolts for ORP, and
- 10% for dissolved oxygen.

Purge water will be collected in sealed containers and transported to the facility wastewater treatment system for disposal.

Sampling Schedule – The schedule will remain unchanged from the current schedule performed under the 2014 permit HW-50140. All groundwater sampling at Site H will be performed annually during the third quarter of each calendar year.

Statistical Procedures – The analytical data obtained from the annual detection monitoring event will be subjected to a statistical comparison to determine if a

potential statistically significant increase (SSI) has occurred for each of the detection monitoring parameters over the Background value established for that parameter (listed above). The determination is based on a comparison of the monitoring results to the concentration limits (i.e., PCLs).

VI.B.3.b Table VI.B.3.b – Unit Groundwater Detection Monitoring System

See Tables VI.B.3.a, VI.B.3.b[1]., VI.D. and above in Section VI.B.3.a.

VI.B.3.c Table VI.B.3.c –Groundwater Sample Analysis

See Table VI.B.3.c[1] and Table VI.B.3.c[2]

VI.B.3.d Monitor Well Design Drawings

See Attachment VI.B.3.d – Site H Monitor Well Logs, no new wells are planned

VI.B.3.e Map Depicting Units and Monitoring Information

See Figure VI.B.3.e., Sheets 1 through 8

SECTION 3 VI.C EXEMPTION FROM GROUNDWATER MONITORING FOR AN ENTIRE FACILITY

Not Applicable

SECTION 4 VI.D UNSATURATED ZONE MONITORING

VI.D.1 Hazardous Constituents Monitored

See Tables VI.D., VI.D.1.a – 1, VI.D.1.a – 2, and VI.B.3.a.

VI.D.2 Number of Soil-Pore Liquid Sampling Points

See Tables VI.D.1. and VI.D.1.a – 1

VI.D.3 Number of Soil-Core Sampling Points

See Tables VI.D.1. and VI.D.1.a – 2

TABLES

I.D.	TITLE
VI.A.1	Major Geologic Information (*Also In application*)
VI.A.3.b(1)	Stratigraphic Column
VI.A.4	Waste Management Area Subsurface Conditions (*Also In application*)
VI.A.4.e	Soil Properties (*Supplement*)
VI.B.2.a	Water Level Measurements in Soil Borings (*Supplement*)
VI.B.2.b	Historical Monitor Well Water Levels (*Supplement*)
VI.B.2.c	Upper and Lower Limits of the Ogallala Aquifer (*Supplement*)
VI.B.2.e	Historical Aquifer Flow Characteristics (*Supplement*)
VI.B.3.b[1]	Unit Groundwater Detection Monitoring System (*Also In Application*)
VI.B.3.b.[2]	Groundwater Monitoring System Results – BICA and Site E Programs (*Supplement*)
VI.B.3.c[1]	Groundwater Sample Analysis (*Also In Application*)
VI.B.3.c[2]	Modified Skinner List of Groundwater Sample Analysis (*Supplement*)
VI.D	Current and Historical Constituents Monitored (*Supplement*)
VI.B.3.b.[2]	Groundwater Monitoring System Results – BICA and Site E Programs (*Supplement*)
VI.D.1.a-1	Site H Historical Soil-Pore Liquid Analysis (*Supplement*)
VI.D.1.a-2	Site H Historical Soil-Core Soil Analysis (Supplement)

Table VI.A.1. – Major Geologic Formations
(from Page 107 of the Part B Application)

Names Of Major Geologic Formation(s) Beneath The Facility	Lithology Of The Major Geologic Formation	Formation Thickness (Feet)	Depth To Top Of Formation	
			Feet/MSL[1]	Feet/BGS[2]
Eolian FM	Wind-blown silt and very fine sand	BICA Area: 0 to 20, [Avg. 5.4] Site E LTU: not encountered Site H LTU: 0 to 16, [Avg. 4.5]	BICA Area: 2367.7 to 2521.5, [Avg. 2446.5] Site E LTU: not encountered Site H LTU: 2509.0 to 2505.3, [Avg. 2506.9]	BICA Area: 0.0 Site E LTU: not encountered Site H LTU: 0.0
Ogallala FM (upper sand Unit)	Very fine to medium, subangular silica sand with varying degrees of secondary $CaCO_3$ cementation from very weak to moderately dense	BICA Area: 16 to 139, [Avg. 88.1] Site E LTU: 106.5 to 129, [Avg. 113.4] Site H LTU: 86 to 147, [Avg. 121.9]	BICA Area: 2363.7 to 2518.0, [Avg. 2445.2] Site E LTU: 2447.1 to 2467.4, [Avg. 2486.0] Site H LTU: 2491.3 to 2518.0, [Avg. 2503.6]	BICA Area: 0.0 to 20.2, [Avg. 5.9] Site E LTU: 0.0 Site H LTU: 0.0 to 16.0, [Avg. 6.2]
Ogallala FM (basal gravel Unit)	Fine gravel to cobbles, loose, subrounded silica and chert, isolated zones of intermixed clays and silts, areas where paleo-erosion has removed	BICA Area: 0 to 28, [Avg. 8.2] Site E LTU: 19.5 to 34.0, [Avg. 26.8] Site H LTU: 2 to 38, [Avg. 18.0]	BICA Area: 2340.0 to 2378.1, [Avg. 2357.0] Site E LTU: 2369.1 to 2387.4, [Avg. 2380.2] Site H LTU: 2356.7 to 2405.3, [Avg. 2379.6]	BICA Area: 20.0 to 150.0, [Avg. 92.4] Site E LTU: 99.0 to 110.0, [Avg. 105.9] Site H LTU: 100.0 to 150.0, [Avg. 129.6]
Dockum FM	Red-bed clay, very hard, little to no evidence of bedding (massive) in upper 30 feet	Not fully penetrated at facility (penetrated upper 30 feet). Literature & Oil Field Logs show Dockum to be 800 to 1,450 feet thick in Big Spring Area	BICA Area: 2331.9 to 2367.3, [Avg. 2349.9] Site E LTU: 2349.6 to 2356.8, [Avg. 2353.4] Site H LTU: 2352.7 to 2371.0, [Avg. 2361.2]	BICA Area: 24.0 to 158.0, [Avg. 101.4] Site E LTU: 127.5 to 144.0, [Avg. 2353.4] Site H LTU: 137.0 to 158.0, [Avg. 148.6]

***(1) MSL*: Mean Sea Level**

***MLGL*: Mean Low-tide Gulf Level**

***(2) BGS*: Below Grade Surface**

Table VI.B.3.b(1)

Stratigraphic Column

Alon USA LP - Big Spring Refinery - Big Spring, Texas

System	Series or Group	Stratigraphic Units	Unit Characteristics	(2) Average Thickness (feet)								Avg Depth at Facility (ft-BGL)	(1) Hydraulic Conductivity (gpd/ft^2)	(1) Depositional History	(1) Aquifer Characteristics
				BICA	Site E	Site H	CSA	MNA	E-EXC	SE-EXC	W-EXC				
Quaternary	Pleistocene to Recent	Eolian FM	Silt and very fine sand	6.4	0	6.2	15	4.7	9.7	3.5	8.5	0	3 to 6	Wind-borne Dunes	not known to yield water to wells
Tertiary	Pliocene	Ogallala FM	Fine to Medium Sand	85.9	113.4	121.9	124	54.1	82	91.5	80	5	322	Low to Medium energy alluvial	yields low volumes of variable quality water to wells
			Fine to Medium Gravel	7.9	26.8	20.4	7	8.9	21	2.5	1.5	95	1200	Medium to high energy alluvial	yields moderate volumes of water to wells
Erosional Unconformity (~3000-feet of Cretaceous missing															
Triassic	Dockum Group	Chinle FM	Massive red and purple interbedded clay and shale	570								104	0.001	Deep basin deposition. Enclosed by the Amarillo uplift, Bravo dome, and Matador arch to the north, the Central Basin Platform to the west, and the Ouachita uplift to the south and east. Primary depositional in-flow was from the Ouchita uplift.	yields very small volume of saline water from lower unit partings
		Santa Rosa FM	fine to coarse gradational sandstone with interbedded shales	580								674	~10		yields highly saline water in small volumes
		Tacovea FM	Massive red and brown shale with interbedded sand	270								1254	0.0001 to 0.00001		not known to yield water to wells

(1) Information concerning the Eolian and Ogallala Formations from site-specific studies and tests, information concerning the Dockum Group from Murray, P.A., *Geology and Paleontology of the Dockum Formation (Upper Triassic), West Texas and Eastern New Mexico,* Masters Thesis, Tarleton State University

(2) Information concerning the thickness of the Eolian and Ogallala Formations from site-specific studies, information concerning the Dockum Group from *Geologic Atlas of Texas, Big Spring Sheet,* Bureau of Economic Geology

Table VI.A.4 – Waste Management Area Subsurface Conditions
(from Page 108 of the Part B Application)

Boring Number	Depth Below Grade	Stratum	USC Symbol	Liquid Limit*	Plasticity Index*	Percent Passing #200 Sieve*	Permeability*	Percent Porosity*
Site E LTU Testhole #1	2-3	Clayey SAND, reddish tan, damp, 40% clay, cohesive	SC	24	8	39.6	6.7 E-06	~30
	4-5	Clayey SAND, reddish tan, damp, 21% clay, cohesive	SC	18	Non-Plastic	20.8	6.7 E-06	~30
	9-10	Clayey SAND, reddish tan, damp, 32% clay, cohesive	SC	19	5	31.8	1.0 E-05	~30
	12-13	Clayey SAND, reddish tan, damp, 16% clay, loose	SC	15	Non-Plastic	15.6	1.0 E-05	~30
	29-30	Clayey SAND, reddish tan, damp, 10% clay, loose	SC			10.4		~30
	39-40	Clayey SAND, reddish tan, damp, 30% clay, cohesive	SC			29.8		~30
	49-50	Clayey SAND, reddish tan, damp, 12% clay, loose	SC			11.5		~30
	69-70	Clayey SAND, reddish tan, damp, 19% clay, cohesive	SC			19		~30
SITE E LTU Testhole #2	3-Feb	Clayey SAND, reddish tan, damp, 32% clay, cohesive	SC	21	4	31.9	3.6 E-06	~30
	5-Apr	Clayey SAND, reddish tan, damp, 20% clay, cohesive	SC	17	3	19.7	5.6 E-06	~30
	10-Sep	Clayey SAND, reddish tan, damp, 14% clay, cohesive	SC	14	Non-Plastic	13.6	5.9 E-06	~30
	14-15	SAND, course-grained with caliche nodules, reddish-tan, dry, loose	SP	15	Non-Plastic	5	1.4 E-06	~30

Table VI.A.4 – Waste Management Area Subsurface Conditions
(from Page 108 of the Part B Application)

Boring Number	Depth Below Grade	Stratum	USC Symbol	Liquid Limit*	Plasticity Index*	Percent Passing #200 Sieve*	Permeability*	Percent Porosity*
SITE E LTU Testhole #2 (continued)	29-30	SAND, course-grained with caliche nodules, reddish-tan, dry, loose	SP			4.3		~30
	44-45	Clayey SAND, reddish tan, damp, 25% clay, cohesive	SC			25.3		~30
	64-65	Clayey SAND, course-grained with caliche nodules, reddish-tan, damp, slightly cohesive	SC			10		~30
	74-75	Clayey SAND, reddish tan, damp, 26% clay, cohesive	SC			26		~30
Testhole #3	3-Feb	Clayey SAND, reddish tan, damp, 37% clay, cohesive	SC	23	8	36.5	6.3 E-06	~30
	5-Apr	Clayey SAND, reddish tan, damp, 28% clay, cohesive	SC	26	12	28.1	1.7 E-05	~30
	8-Jul	Clayey SAND, reddish tan, damp, 37% clay, cohesive	SC	23	6	36.7	1.5 E-05	~30
	15-16	Clayey SAND, reddish tan, damp, 35% clay, cohesive	SC			34.6		~30
	29-30	Clayey SAND, reddish tan, damp, 37% clay, cohesive	SC			37.1		~30
	39-40	Clayey SAND, reddish tan, damp, 37% clay, cohesive	SC			23.1		~30
	59-60	Clayey SAND, reddish tan, damp, 20% clay, cohesive	SC			19.7		~30
	79-80	Clayey SAND, reddish tan, damp, 19% clay, cohesive	SC			19.4		~30

Table VI.A.4 – Waste Management Area Subsurface Conditions
(from Page 108 of the Part B Application)

Boring Number	Depth Below Grade	Stratum	USC Symbol	Liquid Limit*	Plasticity Index*	Percent Passing #200 Sieve*	Permeability*	Percent Porosity*
SITE E LTU Testhole #4	**5-Apr**	**Clayey SAND, reddish-tan, wet, 17% clay, cohesive**	**SC**	**25**	**10**	**16.9**	**4.7 E-06**	**~30**
	7-Jun	**Clayey SAND, reddish-tan, wet, 21% clay, cohesive**	**SC**	**22**	**6**	**20.8**	**9.4 E-06**	**~30**
	9-Aug	**Clayey SAND, reddish-tan, wet, 30% clay, cohesive**	**SC**	**22**	**6**	**30.2**	**5.6 E-06**	**~30**
	14-15	**Clayey SAND, reddish-tan, wet, 18% clay, cohesive**	**SC**			**17.5**		**~30**
	29-30	**Clayey SAND, reddish-tan, wet, 21% clay, cohesive**	**SC**			**20.9**		**~30**
	39-40	**Clayey SAND, reddish-tan, wet, 33% clay, cohesive**	**SC**			**33.1**		**~30**
	59-60	**Clayey SAND, reddish-tan, wet, 29% clay, cohesive**	**SC**			**28.5**		**~30**
	79-80	**Clayey SAND, reddish-tan, wet, 24% clay, cohesive**	**SC**			**24.1**		**~30**

Maximum depth: **136** feet below grade
2346 feet above MSL

Eolian & Ogallala Formation Upper Sand Averages	**0-5 ftBGL**	**not applicable [na]**	**na**	**22**	**8**	**38.1**	**7.2 E-06**	~30
	5-10 ftBGL	**na**	**na**	**19**	**6**	**35.6**	**9.3 E-06**	~30
	10-20 ftBGL	**na**	**na**	**15**	**Non-plastic**	**24.6**	**1.2 E-05**	~30
	20-30 ftBGL	**na**	**na**			**26.2**		~30
	30+ ftBGL	**na**	**na**			**35.9**		~30

Table VI.A.4.e

Soil Properties

Symbol	AcA	AfB	AmB	MoC	PfB	Ps	Sr	Tf
Name	Acuff	Amarillo		MoBeetie	Portales	Potter	Springer	Tivoli
Description	loam	fine sandy loam	fine loamy sand	fine sandy loam	fine sandy loam		loamy fine sand	fine sand
SWMUs On Soil	BICA	BICA	BICA	BICA	BICA	BICA	Site H, Site E, CSU, BICA	none
PHYSICAL DESCRIPTION:								
Depth (inches)	60	64	48	56	60	6	70	60
Permeability (in/day)	0.8-2.5	0.8-5.0	0.8-5.0	0.8-2.5	0.8-2.5	0.8-2.5	0.5-10.0	0.5-10.0
Water Capacity (in/in)	0.15	0.13	0.13	0.13	0.11-0.13	0.15	0.08-0.11	0.06
pH (stand units)	6.6-8.3	6.6-8.3	6.6-8.3	7.8-8.3	7.8-8.3	7.8-8.3	6.6-8.3	6.6-8.3
ENGINEERING PROPERTIES:								
USDA Texture by Depth (in inches)	0-8" loam	0-13" fine sandy loam	0-10" loamy fine sand	0-56" fine sandy loam	0-15" fine sandy loam	0-6" loam	0-12" loamy fine sand	0-60" fine sand
	8-60" sandy clay loam	13-46" sandy clay loam	10-38" sandy clay loam		15-60" sandy clay loam		12-48" fine sandy loam	
		46-64" clay loam	38-48" fine sandy loam				48-70" loamy fine sand	
USCS Symbol	SC or CL	SC or CL	SC or CL	SM, SC, or CL	ML, SC, or CL	ML or CL	SM	
Size Gradation:	% Passing	% Passing	% Passing	% Passing	% Passing	% Passing	% Passing	% Passing
#4 (4.7 mm)	100	100	100	90-100	98-100	90-100	90-100	100
#10 (2.0 mm)	80-90	70-90	60-90	70-90	70-100	50-85	70-95	80-90
#200 (2.0 mm)	40-60	30-65	15-40	40-55	40-65	50-75	15-55	5-10
Shrink-Swell Potential	Low to Moderate	Low to Moderate	Low to Moderate	Low	Low to Moderate	Low	Low	Low
CEC (meq/100g)	22.2	22.4	17.8	unknown	unknown	19.1	22.6	unknown
EROSIONAL CHARACTERISTICS:								
Slope	0-1%	1-3%	0-3%	3-5%	1-3%	0-1%	0-1%	0-1%
Water: Channeling, Gullying Overland Flow	Moderate	Moderate	Low to Moderate	Moderate to Mod. Rapid	Moderate	High	High	Moderate
Water: Embankments Dikes & Levees	Mod. Piping & Gullying	Mod. Piping & Gullying	Moderate	Severe	Moderate Piping	High	High	Moderate
Wind: Irrigation	Mod. Soil Blowing	Soil Blowing	Soil Blowing	Soil Blowing	Soil Blowing	Low	High	Very High
Wind: Terraces & Diversions	Mod. Soil Blowing	Soil Blowing	Soil Blowing	Soil Blowing	Erodes Easily	Low	High	Very High

Table VI.B.2.a

Water Level Measurements in Soil Borings

Alon USA LP - Big Spring Refinery - Big Spring, Texas

Well NUMBER	Location		Month & Year Drilled	Depth Top Saturation Identified ft-BGL	Level in Boring after +/-24 hours ft-BGL	Difference in ft (_) indicates drop	Screened Interval Based on Measurements		Purpose of Well Installation
	NORTHING	EASTING					Top (ft-BGL)	Bottom (ft-BGL)	
P-3	241045.3	790438.4	Feb-84	*not recorded*			49.0	63.0	recovery
MW-38	243667.5	791184.8	Sep-87	*96.0*	97.2	(1.2)	95.0	115.0	upper zone
MW-38A	243661.3	791170.2	Sep-87	96.0	97.4	(1.4)	110.0	146.0	deeper zone
MW-39	243127.8	790961.9	Sep-87	*80.0*	84.4	(4.4)	79.0	99.0	upper zone
MW-39A	243112.6	790966.5	Sep-87	80.0	84.7	(4.7)	99.0	130.0	deeper zone
MW-40	242865.3	791227.2	Sep-87	*88.0*	87.1	7.4	87.0	107.0	upper zone
MW-40A	242861.9	791217.4	Sep-87	88.0	81.3	6.7	108.0	128.0	deeper zone
MW-41	243095.3	791359.1	Sep-87	*91.0*	90.3	2.3	90.0	113.0	upper zone
MW-41A	243108.4	791358.4	Sep-87	91.0	89.2	1.8	106.8	130.8	deeper zone
MW-52	247820.4	790138.4	Mar-89	*115.0*	108.9	6.1	105.0	125.0	upper zone
MW-52A	247818.2	790127.3	Mar-89	115.0	108.8	6.2	137.0	157.0	deeper zone
MW-53	247196.8	790619.6	Mar-89	*96.0*	101.2	(5.2)	96.0	116.0	upper zone
MW-53A	247195.7	790608.5	Mar-89	96.0	101.0	(4.9)	117.0	137.0	deeper zone
MW-54	247067.6	790035.9	Mar-89	*98.0*	98.7	(0.7)	98.5	118.5	upper zone
MW-54A	247060.3	790053.3	Mar-89	98.0	98.5	(0.5)	118.0	138.0	deeper zone
MW-74	247164.6	790468.0	Jun-92	*95.0*	99.2	(4.2)	94.0	114.0	upper zone
MW-74A	247162.3	790458.6	Jun-92	95.0	99.6	(4.6)	126.0	146.0	deeper zone
MW-75	247088.8	790222.1	Jun-92	*96.0*	99.4	(3.4)	95.0	115.0	upper zone
MW-75A	247091.9	790230.2	Jun-92	96.0	100.4	(4.4)	135.0	155.0	deeper zone
MW-76	247976.0	790629.8	Jun-92	*101.0*	111.1	(10.1)	100.0	120.0	upper zone
MW-76A	247974.8	790620.7	Jun-92	101.0	110.7	(9.7)	138.0	158.0	deeper zone
MW-77	247474.5	790109.5	Jun-92	*101.0*	101.6	(0.6)	100.0	120.0	upper zone
MW-77A	247481.8	790113.4	Jun-92	101.0	102.4	(1.4)	130.0	150.0	deeper zone
MW-78	237751.2	791127.7	Jun-92	*40.0*	47.8	(7.8)	39.0	59.0	upper zone
MW-78A	237741.8	791127.7	Jun-92	40.0	48.3	(8.3)	66.0	72.0	deeper zone
MW-79	237967.7	792296.1	Jun-92	*52.0*	67.8	(15.8)	51.0	71.0	upper zone
MW-79A	237965.1	792288.0	Jun-92	52.0	68.1	(16.1)	91.0	111.0	deeper zone
MW-80	238485.7	790471.3	Jun-92	*62.0*	65.7	(3.7)	61.0	81.0	upper zone
MW-80A	238541.7	790460.4	Jun-92	62.0	64.7	(2.7)	78.0	108.0	deeper zone
RW-106	240132.8	791443.7	Aug-92	58.0	59.6	(1.6)	50.0	85.0	recovery
MW-109	236671.4	791458.8	Feb-93	*4.0*	4.7	(0.7)	3.0	22.0	upper zone
MW-109A	236684.8	791463.3	Feb-93	4.0	4.7	(0.7)	14.0	24.0	deeper zone
RW-112	237781.5	791370.5	Sep-93	23.0	17.8	5.2	20.0	35.0	recovery
MW-125	238434.7	789189.3	Nov-93	*69.0*	68.0	4.3	68.0	78.0	upper zone
MW-125A	238427.7	789195.3	Nov-93	69.0	64.7	4.3	70.0	90.0	deeper zone
MW-126	237433.1	789624.6	Nov-93	*18.0*	17.2	3.0	17.0	37.0	upper zone
MW-126A	237438.1	789625.1	Nov-93	18.0	15.0	3.0	20.0	40.0	deeper zone
RW-140	237849.1	791712.2	Feb-94	18.0	17.2	0.8	12.0	42.0	recovery
RW-141	237433.8	789813.3	Feb-94	39.0	63.7	(24.7)	31.0	61.0	recovery
RW-142	237654.5	790806.9	Feb-94	65.0	58.8	6.2	60.0	90.0	recovery
RW-143	238020.1	792459.8	Feb-94	71.0	55.1	15.9	65.0	95.0	recovery
RW-144	238215.7	793317.6	Feb-94	70.0	68.2	1.8	62.0	97.0	recovery
RW-145	238417.2	794203.3	Feb-94	60.0	67.7	(7.7)	57.0	87.0	recovery
RW-146	239131.0	794086.7	Feb-94	68.0	62.9	5.1	66.0	101.0	recovery
RW-147	239790.5	793936.2	Feb-94	79.0	78.2	0.8	70.0	100.0	recovery
IW-149	239410.1	794536.8	Mar-94	*60.0*	58.7	1.3	59.0	79.0	upper zone
IW-149A	239422.0	794537.7	Mar-94	60.0	58.4	1.6	85.0	97.5	deeper zone
IW-150	236496.5	794259.3	Mar-94	*28.0*	30.9	(2.9)	27.0	37.0	upper zone
IW-150A	236473.2	794262.7	Mar-94	28.0	31.0	(3.0)	38.0	48.0	deeper zone
MW-152	242601.3	787822.2	Jun-94	*79.0*	77.8	4.4	78.0	98.0	upper zone
MW-152A	242600.5	787811.2	Jun-94	79.0	74.6	4.4	106.0	116.0	deeper zone
MW-153	242417.7	786548.6	Jun-94	*60.0*	58.3	5.4	57.0	77.0	upper zone
MW-153A	242415.0	786535.9	Jun-94	60.0	54.9	5.1	77.0	87.0	deeper zone
MW-154	240331.2	787130.0	Jun-94	*66.0*	65.3	4.5	65.0	85.0	upper zone
MW-154A	240341.2	787129.8	Jun-94	66.0	61.5	4.5	92.0	102.0	deeper zone
MW-155	240882.0	795495.4	Oct-94	*69.0*	69.4	(0.4)	68.0	88.0	upper zone
MW-155A	240881.1	795473.9	Oct-94	69.0	69.0	(0.0)	97.0	107.0	deeper zone
MW-163	239104.3	787460.1	Mar-95	*15.0*	14.1	2.5	14.0	34.0	upper zone

Table VI.B.2.a

Water Level Measurements in Soil Borings

Alon USA LP - Big Spring Refinery - Big Spring, Texas

Well NUMBER	Location		Month & Year Drilled	Depth Top Saturation Identified ft-BGL	Level in Boring after +/-24 hours ft-BGL	Difference in ft (_) indicates drop	Screened Interval Based on Measurements		Purpose of Well Installation
	NORTHING	EASTING					Top (ft-BGL)	Bottom (ft-BGL)	
MW-163A	239413.6	787453.9	Mar-95	15.0	15.6	(0.6)	42.0	52.0	deeper zone
MW-165	240725.3	797358.1	Mar-95	*70.0*	69.1	0.9	69.0	89.0	upper zone
MW-165A	240706.3	797360.3	Mar-95	70.0	69.0	1.0	103.0	113.0	deeper zone
MW-166	238921.8	798006.6	Mar-95	*69.0*	68.4	1.6	68.0	88.0	upper zone
MW-166A	238913.4	798008.2	Mar-95	69.0	67.5	1.5	90.0	95.0	deeper zone
RW-170	238799.2	794159.8	Aug-95	66.0	68.1	(2.1)	60.5	95.5	recovery
RW-173	240644.8	791178.8	Sep-95	70.0	70.5	(0.5)	62.0	102.0	recovery
RW-174	240619.4	791499.8	Sep-95	75.0	74.9	0.1	70.0	95.0	recovery
RW-175	240652.3	791917.1	Sep-95	53.0	58.0	(5.0)	48.0	88.0	recovery
RW-177	239920.4	791428.4	Sep-95	53.0	53.1	(0.1)	48.0	78.0	recovery
RW-178	240538.7	790328.5	Sep-95	53.0	59.7	(6.7)	48.0	88.0	recovery
RW-179	240641.6	792300.1	Oct-95	48.0	58.3	(10.3)	43.0	73.0	recovery
RW-185	241106.8	791931.9	Oct-95	67.0	74.2	(7.2)	58.0	98.0	recovery
RW-192	240501.5	789968.5	Oct-95	73.0	84.4	(11.4)	66.0	106.0	recovery
RW-194	239498.9	794005.0	Oct-96	67.0	70.7	(3.7)	60.5	105.5	recovery
RW-195	238360.2	793840.5	Oct-96	63.0	84.9	(21.9)	55.0	95.0	recovery
RW-196	238163.8	792920.5	Oct-96	68.0	74.2	(6.2)	63.0	103.0	recovery
RW-197	237968.2	792117.4	Oct-96	52.0	52.9	(0.9)	47.0	82.0	recovery
RW-198	237508.4	790200.3	Oct-96	68.0	64.5	3.5	65.0	85.0	recovery
RW-199	237741.7	791038.0	Oct-96	60.0	31.8	28.2	47.0	77.0	recovery
MW-214	243573.4	793754.7	Jan-97	*79.0*	78.8	0.2	78.0	98.0	upper zone
MW-214A	243560.9	793756.8	Feb-97	79.0	78.2	0.8	115.0	120.0	deeper zone
MW-215	243253.3	795273.1	Feb-97	*92.0*	90.9	2.3	91.0	111.0	upper zone
MW-215A	243256.2	795287.0	Jan-97	92.0	88.6	3.4	123.0	128.0	deeper zone
MW-218	241950.9	794588.7	Feb-97	*81.0*	80.1	3.5	80.0	100.0	upper zone
MW-218A	241951.5	794600.3	Jan-97	81.0	77.9	3.1	111.0	116.0	deeper zone
MW-220	244721.8	792847.8	Nov-97	*95.0*	89.2	5.8	89.0	109.0	upper zone
MW-220A	244737.0	792839.0	Oct-97	95.0	90.2	4.8	130.0	135.0	deeper zone
MW-221	245810.9	791199.4	Oct-97	*115.0*	104.9	10.2	103.0	123.0	upper zone
MW-221A	245814.7	791214.8	Oct-97	115.0	104.3	10.7	150.0	155.0	deeper zone
MW-223	246138.0	792439.7	Oct-97	*101.0*	98.3	3.7	98.0	118.0	upper zone
MW-223A	246140.8	792455.6	Oct-97	*101.0*	98.6	2.4	140.0	145.0	deeper zone
MW-224	246794.5	792342.9	Nov-97	*120.0*	112.5	7.5	111.0	131.0	upper zone
MW-224A	246787.9	792356.7	Oct-97	*120.0*	112.1	7.9	152.0	157.0	deeper zone
MW-225	243803.1	787714.6	Nov-97	*78.0*	77.3	4.2	77.0	97.0	upper zone
MW-225A	243815.8	787711.9	Nov-97	*78.0*	73.9	4.1	105.0	110.0	deeper zone
MW-227	245006.6	787568.9	Nov-97	*83.0*	79.6	3.4	79.0	99.0	upper zone
MW-227A	245019.4	787559.7	Oct-97	*83.0*	80.1	2.9	119.0	124.0	deeper zone
RW-228	242121.7	789911.7	Feb-02	*67.0*	68.6	(1.6)	58.0	98.0	recovery
MW-229	242549.5	787275.6	Feb-08	*74.5*	76.7	(2.2)	69.5	89.5	upper zone
MW-230	241655.4	786833.9	Feb-08	*75.0*	75.1	(0.1)	70.0	90.0	upper zone
MW-230A	241646.5	786835.5	Feb-08	*75.0*	75.1	(0.1)	98.0	110.5	deeper zone
MW-231	241426.4	787801.2	Feb-08	*60.5*	59.2	1.4	55.0	75.0	upper zone
MW-232	238608.4	795182.5	Feb-08	*66.0*	70.8	(4.8)	60.0	80.0	upper zone
MW-233	242549.5	787275.6	Feb-08	*65.0*	66.5	(1.5)	60.0	80.0	upper zone
MW-234	242328.6	794163.2	Feb-08	*85.0*	85.9	(0.9)	80.5	100.5	upper zone
IW-235	239773.0	791612.0	Feb-08	*35.0*	33.3	1.7	25.0	50.0	upper zone
IW-236	239723.5	791615.4	Feb-08	*32.0*	29.6	2.4	22.0	47.0	upper zone
RW-237	244411.6	791731.4	Feb-12	*103.0*	113.3	(10.3)	95.0	118.0	upper zone
IW-238	244408.4	791855.4	Feb-12	*103.0*	112.4	(9.4)	90.0	120.0	upper zone
IW-239	244272.9	791699.1	Feb-12	*102.0*	110.1	(8.1)	87.0	117.0	upper zone
IW-240	243780.7	791892.7	Feb-12	*101.0*	109.3	(8.3)	82.0	112.0	upper zone
RW-241	242862.6	789625.6	Feb-13	*80.5*	90.6	(10.0)	72.0	102.0	recovery
RW-242	242845.0	789475.4	Feb-13	*80.5*	91.1	(10.5)	67.0	97.0	recovery
RW-243	242836.5	789425.3	Feb-13	*79.7*	90.0	(10.3)	70.0	100.0	recovery
RW-244	242998.8	789499.9	Feb-13	*78.7*	90.2	(11.5)	70.0	100.0	recovery
RW-245	242958.2	789354.5	Feb-13	*79.1*	90.8	(11.7)	65.0	95.0	recovery
RW-246	246532.3	791261.9	Dec-12	*75.0*	132.5	(57.5)	53.0	93.0	recovery

Table VI.B.2.a

Water Level Measurements in Soil Borings

Alon USA LP - Big Spring Refinery - Big Spring, Texas

Well NUMBER	Location		Month & Year Drilled	Depth Top Saturation Identified	Level in Boring after +/-24 hours	Difference in ft (_) indicates drop	Screened Interval Based on Measurements		Purpose of Well Installation
	NORTHING	EASTING		ft-BGL	ft-BGL		Top (ft-BGL)	Bottom (ft-BGL)	
RW-247	240460.4	789425.5	Nov-15	*79.0*	78.9	0.1	57.0	97.0	recovery
RW-248	240477.7	789667.6	Nov-15	*78.0*	78.2	(0.2)	65.0	105.0	recovery
RW-249	240431.0	789807.6	Nov-15	*78.0*	77.6	0.4	65.0	105.0	recovery
RW-250	240543.4	790129.7	Nov-15	*66.0*	66.2	(0.2)	55.0	95.0	recovery
RW-251	240457.0	789353.2	Mar-16	*72.0*	71.8	0.2	56.0	96.0	recovery
RW-252	240471.4	789592.6	Mar-16	*76.0*	75.8	0.2	56.0	96.0	recovery
RW-253	240481.9	789743.4	Mar-16	*77.0*	76.6	0.4	56.0	96.0	recovery
RW-254	240497.1	789852.2	Mar-16	*76.0*	76.2	(0.2)	56.0	96.0	recovery
RW-255	240521.4	790014.7	Mar-16	*80.0*	79.2	0.8	56.0	96.0	recovery
RW-256	240356.5	789878.8	Mar-16	*78.0*	77.9	0.1	56.0	96.0	recovery
RW-257	240450.5	789258.5	Jun-16	*70.0*	71.4	(1.4)	50.0	90.0	recovery
RW-258	240383.6	789640.9	Jun-16	*78.0*	78.1	(0.0)	53.0	93.0	recovery
RW-259	240389.1	789710.7	Jun-16	*80.0*	82.7	(2.7)	54.0	94.0	recovery
RW-260	240338.0	789752.6	Jun-16	*80.0*	80.0	(0.0)	55.0	95.0	recovery
RW-261	240303.9	789853.6	Jun-16	*76.0*	80.1	(4.1)	55.0	95.0	recovery
RW-262	240434.1	789099.8	Oct-16	*68.0*	87.7	(19.7)	48.0	88.0	recovery
RW-263	240375.8	789552.1	Oct-16	*78.0*	87.0	(9.0)	53.0	93.0	recovery
RW-264	240239.8	789727.5	Oct-16	*78.0*	86.7	(8.7)	55.0	95.0	recovery
RW-265	240139.8	789969.5	Oct-16	*72.0*	87.4	(15.4)	53.0	93.0	recovery
RW-266	240407.0	790017.3	Oct-16	*73.0*	73.6	(0.6)	53.0	93.0	recovery
RW-267	240445.6	789173.2	Dec-16	*68.0*	68.0	0.0	48.0	88.0	recovery
RW-268	240375.9	789223.0	Dec-16	*70.0*	69.7	0.3	54.0	94.0	recovery
RW-269	240396.1	789306.3	Dec-16	*72.0*	71.5	0.5	55.0	95.0	recovery
RW-270	240403.4	789381.3	Dec-16	*72.0*	72.7	(0.7)	53.0	93.0	recovery
RW-271	240361.9	789464.0	Dec-16	*76.0*	75.8	0.2	55.0	95.0	recovery
RW-272	240329.8	789675.0	Dec-16	*78.0*	80.4	(2.4)	58.0	98.0	recovery
RW-273	240225.9	789910.0	Dec-16	*74.0*	74.8	(0.8)	55.0	95.0	recovery
RW-274	240369.3	789156.6	Mar-18	*65.0*	68.6	(3.6)	60.0	90.0	recovery
RW-275	240276.1	789321.2	Mar-18	*65.0*	71.8	(6.8)	60.0	90.0	recovery
RW-276	240407.8	789913.0	Mar-18	*65.0*	83.8	(18.8)	60.0	90.0	recovery
RW-277	240432.8	790061.2	Mar-18	*65.0*	71.0	(6.0)	60.0	80.0	recovery
RW-278	240429.3	790141.4	Mar-18	*45.0*	62.6	(17.6)	40.0	80.0	recovery
RW-279	240903.2	789644.4	Mar-18	*45.0*	65.1	(20.1)	40.0	80.0	recovery
RW-280	240910.1	789777.4	Mar-18	*45.0*	62.3	(17.3)	40.0	80.0	recovery
RW-281	240925.3	790178.3	Mar-18	*45.0*	55.2	(10.2)	40.0	80.0	recovery
RW-282	240908.2	789729.2	Mar-18	*45.0*	64.6	(19.6)	40.0	80.0	recovery
RW-283	240912.2	789856.6	Mar-18	*45.0*	61.0	(16.0)	40.0	80.0	recovery
RW-284	240917.3	789977.9	Mar-18	*45.0*	58.7	(13.7)	40.0	80.0	recovery
RW-285	240919.3	790052.2	Mar-18	*45.0*	57.3	(12.3)	40.0	80.0	recovery
RW-286	240923.6	790125.0	Mar-18	*45.0*	56.4	(11.4)	40.0	80.0	recovery
RW-287	240925.5	790224.1	Jun-18	*45.0*	57.6	(12.6)	40.0	80.0	recovery
RW-288	240926.8	790266.8	Jun-18	*45.0*	54.1	(9.1)	40.0	80.0	recovery
RW-289	240930.0	790313.5	Jun-18	*45.0*	57.8	(12.8)	40.0	80.0	recovery
RW-290	Awaiting Final Survey		Jan-19	*40.0*	55.0	(15.0)	40.0	80.0	recovery
RW-291	Awaiting Final Survey		Jan-19	*40.0*	53.3	(13.3)	40.0	80.0	recovery
RW-292	Awaiting Final Survey		Jan-19	*40.0*	54.9	(14.9)	40.0	80.0	recovery
RW-296	Awaiting Final Survey		Jan-19	*60.0*	78.5	(18.5)	60.0	100.0	recovery
RW-297	Awaiting Final Survey		Jan-19	*60.0*	77.7	(17.7)	60.0	100.0	recovery
RW-298	Awaiting Final Survey		Jan-19	*60.0*	78.4	(18.4)	60.0	100.0	recovery
RW-299	Awaiting Final Survey		Jan-19	*60.0*	73.7	(13.7)	60.0	100.0	recovery
RW-300	Awaiting Final Survey		Jan-19	*60.0*	73.7	(13.7)	60.0	100.0	recovery
RW-301	Awaiting Final Survey		Mar-20	*60.0*	77.1	(17.1)	56.0	96.0	recovery
RW-302	Awaiting Final Survey		Mar-20	*60.0*	77.6	(17.6)	60.0	90.0	recovery
RW-303	Awaiting Final Survey		Mar-20	*60.0*	80.2	(20.2)	55.0	95.0	recovery
RW-304	Awaiting Final Survey		Mar-20	*60.0*	79.6	(19.6)	58.0	98.0	recovery

ft-BGL : feet below grade level

Table VI.B.2.b. - Historical Monitor Well Water Levels

Alon USA Big Spring Refinery [CP-50140]

			FLUID LEVEL MEASUREMENT EVENTS											
		Data	Jan-14	Jul-14	Mar-15	Jul-15	Jan-16	Jul-16	Jan-17	Jul-17	Jan-18	Jul-18	Jan-19	Jul-19
Well >	MW-38	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Program>	SITE E	Groundwater Level (ft-bTOC)	106.08	106.20	106.12	106.09	106.06	105.67	105.54	105.32	105.30	105.66	105.79	105.62
Type >	Background	Groundwater Level (ft-MSL)	2390.90	2390.78	2394.16	2394.19	2394.22	2394.61	2394.74	2394.92	2394.94	2394.58	2394.45	2394.62
		Corrected Groundwater Level (ft-MSL)	2390.90	2390.78	2394.16	2394.19	2394.22	2394.61	2394.74	2394.92	2394.94	2394.58	2394.45	2394.62
Well >	MW-38A	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Program>	SITE E	Groundwater Level (ft-bTOC)	105.93	106.25	106.04	106.03	105.99	105.65	105.51	105.25	105.24	105.62	105.71	105.54
Type >	Background	Groundwater Level (ft-MSL)	2391.48	2391.16	2394.21	2394.22	2394.26	2394.60	2394.74	2395.00	2395.01	2394.63	2394.54	2394.71
		Corrected Groundwater Level (ft-MSL)	2391.48	2391.16	2394.21	2394.22	2394.26	2394.60	2394.74	2395.00	2395.01	2394.63	2394.54	2394.71
Well >	MW-39	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Program>	SITE E	Groundwater Level (ft-bTOC)	92.53	92.79	92.52	92.54	92.31	92.04	91.64	91.60	91.58	91.98	92.13	91.91
Type >	POC	Groundwater Level (ft-MSL)	2390.06	2389.80	2392.95	2392.93	2393.16	2393.43	2393.83	2393.87	2393.89	2393.49	2393.34	2393.56
		Corrected Groundwater Level (ft-MSL)	2390.06	2389.80	2392.95	2392.93	2393.16	2393.43	2393.83	2393.87	2393.89	2393.49	2393.34	2393.56
Well >	MW-39A	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Program>	SITE E	Groundwater Level (ft-bTOC)	92.65	92.60	92.66	92.66	92.42	92.17	91.73	91.74	91.71	92.12	92.26	92.05
Type >	POC	Groundwater Level (ft-MSL)	2390.23	2390.28	2392.97	2392.97	2393.21	2393.46	2393.90	2393.89	2393.92	2393.51	2393.37	2393.58
		Corrected Groundwater Level (ft-MSL)	2390.23	2390.28	2392.97	2392.97	2393.21	2393.46	2393.90	2393.89	2393.92	2393.51	2393.37	2393.58
Well >	MW-40	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Program>	SITE E	Groundwater Level (ft-bTOC)	87.97	88.19	87.97	87.88	87.58	87.36	86.86	86.90	87.17	87.48	87.91	87.75
Type >	POC	Groundwater Level (ft-MSL)	2389.06	2388.84	2392.04	2392.13	2392.43	2392.65	2393.15	2393.11	2392.84	2392.53	2392.10	2392.26
		Corrected Groundwater Level (ft-MSL)	2389.06	2388.84	2392.04	2392.13	2392.43	2392.65	2393.15	2393.11	2392.84	2392.53	2392.10	2392.26
Well >	MW-40A	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Program>	SITE E	Groundwater Level (ft-bTOC)	88.18	88.36	88.06	87.92	87.61	87.35	86.82	86.96	87.24	87.56	88.04	87.62
Type >	POC	Groundwater Level (ft-MSL)	2388.89	2388.71	2391.36	2391.50	2391.81	2392.07	2392.60	2392.46	2392.18	2391.86	2391.38	2391.80
		Corrected Groundwater Level (ft-MSL)	2388.89	2388.71	2391.36	2391.50	2391.81	2392.07	2392.60	2392.46	2392.18	2391.86	2391.38	2391.80
Well >	MW-41	LNAPL Thickness (feet)	0.00	nm	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Program>	SITE E	Groundwater Level (ft-bTOC)	96.46	nm	96.66	96.70	96.48	96.27	95.89	95.89	95.91	96.31	96.64	96.41
Type >	POC	Groundwater Level (ft-MSL)	2389.80	nm	2392.68	2392.64	2392.86	2393.07	2393.45	2393.45	2393.43	2393.03	2392.70	2392.93
		Corrected Groundwater Level (ft-MSL)	2389.80	nm	2392.68	2392.64	2392.86	2393.07	2393.45	2393.45	2393.43	2393.03	2392.70	2392.93
Well >	MW-41A	LNAPL Thickness (feet)	0.00	nm	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Program>	SITE E	Groundwater Level (ft-bTOC)	96.98	nm	95.65	97.34	97.11	96.94	96.48	96.56	96.58	96.97	97.28	97.03
Type >	POC	Groundwater Level (ft-MSL)	2389.82	nm	2394.23	2392.54	2392.77	2392.94	2393.40	2393.32	2393.30	2392.91	2392.60	2392.85
		Corrected Groundwater Level (ft-MSL)	2389.82	nm	2394.23	2392.54	2392.77	2392.94	2393.40	2393.32	2393.30	2392.91	2392.60	2392.85
Well >	MW-52	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Program>	BICA/Site H	Groundwater Level (ft-bTOC)	113.05	112.80	112.24	112.02	111.91	111.56	111.41	111.08	110.88	110.95	110.98	110.71
Type >	Background	Groundwater Level (ft-MSL)	2402.05	2402.30	2405.62	2405.84	2405.95	2406.30	2406.45	2406.78	2406.98	2406.91	2406.88	2407.15
		Corrected Groundwater Level (ft-MSL)	2402.05	2402.30	2405.62	2405.84	2405.95	2406.30	2406.45	2406.78	2406.98	2406.91	2406.88	2407.15
Well >	MW-52A	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Program>	BICA/Site H	Groundwater Level (ft-bTOC)	114.95	113.80	113.72	113.45	113.22	112.94	112.75	112.46	112.24	112.50	112.38	112.09
Type >	Background	Groundwater Level (ft-MSL)	2400.13	2401.28	2404.10	2404.37	2404.60	2404.88	2405.07	2405.36	2405.58	2405.32	2405.44	2405.73
		Corrected Groundwater Level (ft-MSL)	2400.13	2401.28	2404.10	2404.37	2404.60	2404.88	2405.07	2405.36	2405.58	2405.32	2405.44	2405.73

ft-TOC : Feet Below Top of Casing, ft-MSL : Feet Mean Sea Level, POC : Point of Compliance

Table VI.B.2.b. - Historical Monitor Well Water Levels

Alon USA Big Spring Refinery [CP-50140]

		Data	FLUID LEVEL MEASUREMENT EVENTS									STATISTICS		
			Jan-20	Jul-20	Jan-21	Jul-21	Jan-22	Jul-22	Jan-23	Jul-23	Jan-24	Maximum	Minimum	Average
Well >	**MW-38**	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.12	0.00	0.17	0.25	**0.25**	**0.00**	**0.03**
Program>	**SITE E**	Groundwater Level (ft-bTOC)	105.63	105.45	105.36	105.20	104.94	104.81	104.56	104.72	104.83	**106.20**	**104.56**	**105.47**
Type >	**Background**	Groundwater Level (ft-MSL)	2394.61	2394.79	2394.88	2395.04	2395.30	2395.43	2395.68	2395.52	2395.41	**2395.68**	**2390.78**	**2394.47**
		Corrected Groundwater Level (ft-MSL)	2394.61	2394.79	2394.88	2395.04	2395.30	2395.54	2395.68	2395.65	2395.61	**2395.68**	**2390.78**	**2394.49**
Well >	**MW-38A**	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**	**0.00**
Program>	**SITE E**	Groundwater Level (ft-bTOC)	105.55	105.38	105.28	105.11	104.84	104.62	104.12	104.47	104.52	**106.25**	**104.12**	**105.36**
Type >	**Background**	Groundwater Level (ft-MSL)	2394.70	2394.87	2394.97	2395.14	2395.41	2395.63	2396.13	2395.78	2395.73	**2396.13**	**2391.16**	**2394.62**
		Corrected Groundwater Level (ft-MSL)	2394.70	2394.87	2394.97	2395.14	2395.41	2395.63	2396.13	2395.78	2395.73	**2396.13**	**2391.16**	**2394.62**
Well >	**MW-39**	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**	**0.00**
Program>	**SITE E**	Groundwater Level (ft-bTOC)	91.94	91.79	91.58	91.52	91.06	90.84	90.76	90.59	90.73	**92.79**	**90.59**	**91.73**
Type >	**POC**	Groundwater Level (ft-MSL)	2393.53	2393.68	2393.89	2393.95	2394.41	2394.63	2394.71	2394.88	2394.74	**2394.88**	**2389.80**	**2393.46**
		Corrected Groundwater Level (ft-MSL)	2393.53	2393.68	2393.89	2393.95	2394.41	2394.63	2394.71	2394.88	2394.74	**2394.88**	**2389.80**	**2393.46**
Well >	**MW-39A**	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**	**0.00**
Program>	**SITE E**	Groundwater Level (ft-bTOC)	92.08	91.92	91.76	91.37	91.21	91.01	90.93	90.78	90.94	**92.66**	**90.78**	**91.85**
Type >	**POC**	Groundwater Level (ft-MSL)	2393.55	2393.71	2393.87	2394.26	2394.42	2394.62	2394.70	2394.85	2394.69	**2394.85**	**2390.23**	**2393.52**
		Corrected Groundwater Level (ft-MSL)	2393.55	2393.71	2393.87	2394.26	2394.42	2394.62	2394.70	2394.85	2394.69	**2394.85**	**2390.23**	**2393.52**
Well >	**MW-40**	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**	**0.00**
Program>	**SITE E**	Groundwater Level (ft-bTOC)	87.53	87.45	87.22	87.04	86.51	86.44	86.31	86.25	86.47	**88.19**	**86.25**	**87.25**
Type >	**POC**	Groundwater Level (ft-MSL)	2392.48	2392.56	2392.79	2392.97	2393.50	2393.57	2393.70	2393.76	2393.54	**2393.76**	**2388.84**	**2392.48**
		Corrected Groundwater Level (ft-MSL)	2392.48	2392.56	2392.79	2392.97	2393.50	2393.57	2393.70	2393.76	2393.54	**2393.76**	**2388.84**	**2392.48**
Well >	**MW-40A**	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**	**0.00**
Program>	**SITE E**	Groundwater Level (ft-bTOC)	87.61	87.42	87.21	87.05	86.49	86.39	86.24	86.19	86.44	**88.36**	**86.19**	**87.27**
Type >	**POC**	Groundwater Level (ft-MSL)	2391.81	2392.00	2392.21	2392.37	2392.93	2393.03	2393.18	2393.23	2392.98	**2393.23**	**2388.71**	**2391.92**
		Corrected Groundwater Level (ft-MSL)	2391.81	2392.00	2392.21	2392.37	2392.93	2393.03	2393.18	2393.23	2392.98	**2393.23**	**2388.71**	**2391.92**
Well >	**MW-41**	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**	**0.00**
Program>	**SITE E**	Groundwater Level (ft-bTOC)	96.35	96.25	96.03	95.90	95.41	95.37	95.21	95.18	95.29	**96.70**	**95.18**	**96.03**
Type >	**POC**	Groundwater Level (ft-MSL)	2392.99	2393.09	2393.31	2393.44	2393.93	2393.97	2394.13	2394.16	2394.05	**2394.16**	**2389.80**	**2393.16**
		Corrected Groundwater Level (ft-MSL)	2392.99	2393.09	2393.31	2393.44	2393.93	2393.97	2394.13	2394.16	2394.05	**2394.16**	**2389.80**	**2393.16**
Well >	**MW-41A**	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**	**0.00**
Program>	**SITE E**	Groundwater Level (ft-bTOC)	96.98	96.84	96.66	96.53	96.17	95.98	95.65	95.82	95.94	**97.34**	**95.65**	**96.57**
Type >	**POC**	Groundwater Level (ft-MSL)	2392.90	2393.04	2393.22	2393.35	2393.71	2393.90	2394.23	2394.06	2393.94	**2394.23**	**2389.82**	**2393.15**
		Corrected Groundwater Level (ft-MSL)	2392.90	2393.04	2393.22	2393.35	2393.71	2393.90	2394.23	2394.06	2393.94	**2394.23**	**2389.82**	**2393.15**
Well >	**MW-52**	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**	**0.00**
Program>	**BICA/Site H**	Groundwater Level (ft-bTOC)	110.76	110.74	110.89	110.98	111.15	111.35	111.65	111.71	112.24	**113.05**	**110.71**	**111.48**
Type >	**Background**	Groundwater Level (ft-MSL)	2407.10	2407.12	2406.97	2406.88	2406.71	2406.51	2406.21	2406.15	2405.62	**2407.15**	**2402.05**	**2406.12**
		Corrected Groundwater Level (ft-MSL)	2407.10	2407.12	2406.97	2406.88	2406.71	2406.51	2406.21	2406.15	2405.62	**2407.15**	**2402.05**	**2406.12**
Well >	**MW-52A**	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**	**0.00**
Program>	**BICA/Site H**	Groundwater Level (ft-bTOC)	112.22	112.28	112.35	112.41	112.33	112.38	112.46	112.40	113.09	**114.95**	**112.09**	**112.78**
Type >	**Background**	Groundwater Level (ft-MSL)	2405.60	2405.54	2405.47	2405.41	2405.49	2405.44	2405.36	2405.42	2404.73	**2405.73**	**2400.13**	**2404.78**
		Corrected Groundwater Level (ft-MSL)	2405.60	2405.54	2405.47	2405.41	2405.49	2405.44	2405.36	2405.42	2404.73	**2405.73**	**2400.13**	**2404.78**

ft-TOC : Feet Below Top of Casing, ft-MSL : Feet Mean Sea Level, POC : Point of Compliance

Table VI.B.2.b. - Historical Monitor Well Water Levels

Alon USA Big Spring Refinery [CP-50140]

		Data	FLUID LEVEL MEASUREMENT EVENTS											
			Jan-14	Jul-14	Mar-15	Jul-15	Jan-16	Jul-16	Jan-17	Jul-17	Jan-18	Jul-18	Jan-19	Jul-19
Well >	MW-53	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	nm	nm	0.00	0.00	0.00	0.00	0.00	0.00
Program>	SITE H	Groundwater Level (ft-bTOC)	107.80	107.42	107.42	107.42	nm	nm	106.40	106.19	106.24	106.27	106.12	106.05
Type >	POC	Groundwater Level (ft-MSL)	2400.31	2403.85	2403.85	2403.85	nm	nm	2404.87	2405.08	2405.03	2405.00	2405.15	2405.22
		Corrected Groundwater Level (ft-MSL)	2400.31	2403.85	2403.85	2403.85	nm	nm	2404.87	2405.08	2405.03	2405.00	2405.15	2405.22
Well >	MW-53A	LNAPL Thickness (feet)	nm	0.00	0.00	0.00	nm	0.00	nm	0.00	0.00	0.00	0.00	0.00
Program>	SITE H	Groundwater Level (ft-bTOC)	nm	107.59	107.13	107.31	nm	107.71	nm	106.27	106.09	106.17	106.15	105.98
Type >	POC	Groundwater Level (ft-MSL)	nm	2403.53	2403.99	2403.81	nm	2400.28	nm	2404.85	2405.03	2404.95	2404.97	2405.14
		Corrected Groundwater Level (ft-MSL)	nm	2403.53	2403.99	2403.81	nm	2400.28	nm	2404.85	2405.03	2404.95	2404.97	2405.14
Well >	MW-54	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	nm	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Program>	SITE H	Groundwater Level (ft-bTOC)	105.40	105.03	104.57	104.41	nm	105.40	103.02	102.82	102.82	102.94	102.91	102.63
Type >	POC	Groundwater Level (ft-MSL)	2399.76	2400.13	2402.39	2402.55	nm	2399.76	2403.94	2404.14	2404.14	2404.02	2404.05	2404.33
		Corrected Groundwater Level (ft-MSL)	2399.76	2400.13	2402.39	2402.55	nm	2399.76	2403.94	2404.14	2404.14	2404.02	2404.05	2404.33
Well >	MW-54A	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	nm	0.00	0.00	0.00	0.00	0.00	0.00
Program>	SITE H	Groundwater Level (ft-bTOC)	104.81	104.27	104.27	104.27	105.08	nm	103.32	103.14	103.14	103.24	103.22	102.95
Type >	POC	Groundwater Level (ft-MSL)	2400.50	2403.00	2403.00	2403.00	2400.23	nm	2403.95	2404.13	2404.13	2404.03	2404.05	2404.32
		Corrected Groundwater Level (ft-MSL)	2400.50	2403.00	2403.00	2403.00	2400.23	nm	2403.95	2404.13	2404.13	2404.03	2404.05	2404.32
Well >	IW-58	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Program>	BICA	Groundwater Level (ft-bTOC)	59.87	59.89	55.74	57.62	56.19	56.05	59.93	60.38	62.01	62.92	59.75	58.42
Type >	Supplemnt	Groundwater Level (ft-MSL)	2375.22	2375.20	2382.10	2380.22	2381.65	2381.79	2377.91	2377.46	2375.83	2374.92	2378.09	2379.42
		Corrected Groundwater Level (ft-MSL)	2375.22	2375.20	2382.10	2380.22	2381.65	2381.79	2377.91	2377.46	2375.83	2374.92	2378.09	2379.42
Well >	IW-58A	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Program>	BICA	Groundwater Level (ft-bTOC)	61.12	61.13	57.13	56.21	54.82	54.67	58.63	59.07	60.78	61.67	58.41	57.08
Type >	Supplemnt	Groundwater Level (ft-MSL)	2374.76	2374.75	2381.88	2382.80	2384.19	2384.34	2380.38	2379.94	2378.23	2377.34	2380.60	2381.93
		Corrected Groundwater Level (ft-MSL)	2374.76	2374.75	2381.88	2382.80	2384.19	2384.34	2380.38	2379.94	2378.23	2377.34	2380.60	2381.93
Well >	MW-74	LNAPL Thickness (feet)	nm	0.00	0.00	0.00	nm	0.00	nm	0.00	0.00	0.00	0.00	0.00
Program>	SITE H	Groundwater Level (ft-bTOC)	nm	106.55	106.01	105.96	nm	106.68	nm	104.91	104.71	104.81	104.80	104.59
Type >	POC	Groundwater Level (ft-MSL)	nm	2403.00	2403.54	2403.59	nm	2399.93	nm	2404.64	2404.84	2404.74	2404.75	2404.96
		Corrected Groundwater Level (ft-MSL)	nm	2403.00	2403.54	2403.59	nm	2399.93	nm	2404.64	2404.84	2404.74	2404.75	2404.96
Well >	MW-74A	LNAPL Thickness (feet)	nm	0.00	0.00	0.00	nm	0.00	nm	0.00	0.00	0.00	0.00	0.00
Program>	SITE H	Groundwater Level (ft-bTOC)	nm	107.40	106.23	105.67	nm	107.05	nm	105.06	104.87	105.07	105.00	104.74
Type >	POC	Groundwater Level (ft-MSL)	nm	2402.14	2403.31	2403.67	nm	2399.49	nm	2404.48	2404.67	2404.47	2404.54	2404.80
		Corrected Groundwater Level (ft-MSL)	nm	2402.14	2403.31	2403.67	nm	2399.49	nm	2404.48	2404.67	2404.47	2404.54	2404.80
Well >	MW-75	LNAPL Thickness (feet)	nm	0.00	0.00	0.00	nm	0.00	nm	0.00	0.00	0.00	0.00	0.00
Program>	SITE H	Groundwater Level (ft-bTOC)	nm	106.40	105.40	105.37	nm	106.09	nm	104.19	104.01	104.11	104.09	103.84
Type >	POC	Groundwater Level (ft-MSL)	nm	2401.98	2402.98	2403.01	nm	2402.29	nm	2404.19	2404.37	2404.27	2404.29	2404.54
		Corrected Groundwater Level (ft-MSL)	nm	2401.98	2402.98	2403.01	nm	2402.29	nm	2404.19	2404.37	2404.27	2404.29	2404.54
Well >	MW-75A	LNAPL Thickness (feet)	nm	0.00	0.00	0.00	nm	0.00	nm	0.00	0.00	0.00	0.00	0.00
Program>	SITE H	Groundwater Level (ft-bTOC)	nm	105.09	105.61	105.47	nm	105.95	nm	104.27	104.03	104.34	104.20	103.91
Type >	POC	Groundwater Level (ft-MSL)	nm	2404.46	2402.77	2402.91	nm	2403.60	nm	2404.11	2404.35	2404.04	2404.18	2404.47
		Corrected Groundwater Level (ft-MSL)	nm	2404.46	2402.77	2402.91	nm	2403.60	nm	2404.11	2404.35	2404.04	2404.18	2404.47

ft-TOC : Feet Below Top of Casing, ft-MSL : Feet Mean Sea Level, POC : Point of Compliance

Table VI.B.2.b. - Historical Monitor Well Water Levels

Alon USA Big Spring Refinery [CP-50140]

		Data	FLUID LEVEL MEASUREMENT EVENTS									STATISTICS		
			Jan-20	Jul-20	Jan-21	Jul-21	Jan-22	Jul-22	Jan-23	Jul-23	Jan-24	Maximum	Minimum	Average
Well >	**MW-53**	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**	**0.00**
Program>	**SITE H**	Groundwater Level (ft-bTOC)	106.02	105.99	106.04	106.09	106.18	106.25	106.25	106.34	106.77	**107.80**	**105.99**	**106.49**
Type >	**POC**	Groundwater Level (ft-MSL)	2405.25	2405.28	2405.23	2405.18	2405.09	2405.02	2405.02	2404.93	2404.50	**2405.28**	**2400.31**	**2404.62**
		Corrected Groundwater Level (ft-MSL)	2405.25	2405.28	2405.23	2405.18	2405.09	2405.02	2405.02	2404.93	2404.50	**2405.28**	**2400.31**	**2404.62**
Well >	**MW-53A**	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**	**0.00**
Program>	**SITE H**	Groundwater Level (ft-bTOC)	105.99	105.95	105.90	105.90	105.96	106.08	106.14	106.16	106.60	**107.71**	**105.90**	**106.39**
Type >	**POC**	Groundwater Level (ft-MSL)	2405.13	2405.17	2405.22	2405.22	2405.16	2405.04	2404.98	2404.96	2404.52	**2405.22**	**2400.28**	**2404.55**
		Corrected Groundwater Level (ft-MSL)	2405.13	2405.17	2405.22	2405.22	2405.16	2405.04	2404.98	2404.96	2404.52	**2405.22**	**2400.28**	**2404.55**
Well >	**MW-54**	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**	**0.00**
Program>	**SITE H**	Groundwater Level (ft-bTOC)	102.72	102.66	102.79	102.72	102.63	102.40	102.43	102.41	102.93	**105.40**	**102.40**	**103.28**
Type >	**POC**	Groundwater Level (ft-MSL)	2404.24	2404.30	2404.17	2404.24	2404.33	2404.56	2404.53	2404.55	2404.03	**2404.56**	**2399.76**	**2403.41**
		Corrected Groundwater Level (ft-MSL)	2404.24	2404.30	2404.17	2404.24	2404.33	2404.56	2404.53	2404.55	2404.03	**2404.56**	**2399.76**	**2403.41**
Well >	**MW-54A**	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**	**0.00**
Program>	**SITE H**	Groundwater Level (ft-bTOC)	103.03	103.00	103.12	103.06	103.09	102.79	102.85	102.75	103.28	**105.08**	**102.75**	**103.43**
Type >	**POC**	Groundwater Level (ft-MSL)	2404.24	2404.27	2404.15	2404.21	2404.18	2404.48	2404.42	2404.52	2403.99	**2404.52**	**2400.23**	**2403.64**
		Corrected Groundwater Level (ft-MSL)	2404.24	2404.27	2404.15	2404.21	2404.18	2404.48	2404.42	2404.52	2403.99	**2404.52**	**2400.23**	**2403.64**
Well >	**IW-58**	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**	**0.00**
Program>	**BICA**	Groundwater Level (ft-bTOC)	59.51	58.09	57.48	54.35	57.02	55.97	56.74	56.40	58.14	**62.92**	**54.35**	**58.21**
Type >	**Supplemnt**	Groundwater Level (ft-MSL)	2378.33	2379.75	2380.36	2383.49	2380.82	2381.87	2381.10	2381.44	2379.70	**2383.49**	**2374.92**	**2379.37**
		Corrected Groundwater Level (ft-MSL)	2378.33	2379.75	2380.36	2383.49	2380.82	2381.87	2381.10	2381.44	2379.70	**2383.49**	**2374.92**	**2379.37**
Well >	**IW-58A**	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**	**0.00**
Program>	**BICA**	Groundwater Level (ft-bTOC)	58.20	57.08	56.10	52.96	55.76	54.68	55.44	55.07	56.89	**61.67**	**52.96**	**57.28**
Type >	**Supplemnt**	Groundwater Level (ft-MSL)	2380.81	2381.93	2382.91	2386.05	2383.25	2384.33	2383.57	2383.94	2382.12	**2386.05**	**2374.75**	**2381.43**
		Corrected Groundwater Level (ft-MSL)	2380.81	2381.93	2382.91	2386.05	2383.25	2384.33	2383.57	2383.94	2382.12	**2386.05**	**2374.75**	**2381.43**
Well >	**MW-74**	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**	**0.00**
Program>	**SITE H**	Groundwater Level (ft-bTOC)	104.62	104.59	104.57	105.60	104.61	104.60	104.71	104.60	105.19	**106.68**	**104.57**	**105.12**
Type >	**POC**	Groundwater Level (ft-MSL)	2404.93	2404.96	2404.98	2403.95	2404.94	2404.95	2404.84	2404.95	2404.36	**2404.98**	**2399.93**	**2404.27**
		Corrected Groundwater Level (ft-MSL)	2404.93	2404.96	2404.98	2403.95	2404.94	2404.95	2404.84	2404.95	2404.36	**2404.98**	**2399.93**	**2404.27**
Well >	**MW-74A**	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**	**0.00**
Program>	**SITE H**	Groundwater Level (ft-bTOC)	104.83	104.82	104.82	104.79	104.89	104.74	104.80	104.85	105.34	**107.40**	**104.74**	**105.28**
Type >	**POC**	Groundwater Level (ft-MSL)	2404.71	2404.72	2404.72	2404.75	2404.65	2404.80	2404.74	2404.69	2404.20	**2404.80**	**2399.49**	**2404.09**
		Corrected Groundwater Level (ft-MSL)	2404.71	2404.72	2404.72	2404.75	2404.65	2404.80	2404.74	2404.69	2404.20	**2404.80**	**2399.49**	**2404.09**
Well >	**MW-75**	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**	**0.00**
Program>	**SITE H**	Groundwater Level (ft-bTOC)	103.89	103.85	103.93	103.91	103.85	103.75	103.81	103.63	104.25	**106.40**	**103.63**	**104.35**
Type >	**POC**	Groundwater Level (ft-MSL)	2404.49	2404.53	2404.45	2404.47	2404.53	2404.63	2404.57	2404.75	2404.13	**2404.75**	**2401.98**	**2404.03**
		Corrected Groundwater Level (ft-MSL)	2404.49	2404.53	2404.45	2404.47	2404.53	2404.63	2404.57	2404.75	2404.13	**2404.75**	**2401.98**	**2404.03**
Well >	**MW-75A**	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**	**0.00**
Program>	**SITE H**	Groundwater Level (ft-bTOC)	104.08	104.11	104.20	104.16	104.11	103.72	103.73	103.64	104.39	**105.95**	**103.64**	**104.39**
Type >	**POC**	Groundwater Level (ft-MSL)	2404.30	2404.27	2404.18	2404.22	2404.27	2404.66	2404.65	2404.74	2403.99	**2404.74**	**2402.77**	**2404.12**
		Corrected Groundwater Level (ft-MSL)	2404.30	2404.27	2404.18	2404.22	2404.27	2404.66	2404.65	2404.74	2403.99	**2404.74**	**2402.77**	**2404.12**

ft-TOC : Feet Below Top of Casing, ft-MSL : Feet Mean Sea Level, POC : Point of Compliance

Table VI.B.2.b. - Historical Monitor Well Water Levels

Alon USA Big Spring Refinery [CP-50140]

		Data	FLUID LEVEL MEASUREMENT EVENTS											
			Jan-14	Jul-14	Mar-15	Jul-15	Jan-16	Jul-16	Jan-17	Jul-17	Jan-18	Jul-18	Jan-19	Jul-19
Well >	MW-76	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Program>	BICA/Site H	Groundwater Level (ft-bTOC)	115.40	115.42	114.92	114.69	114.62	114.35	114.20	113.91	113.75	113.79	113.85	113.64
Type >	Background	Groundwater Level (ft-MSL)	2404.00	2403.98	2407.29	2407.52	2407.59	2407.86	2408.01	2408.30	2408.46	2408.42	2408.36	2408.57
		Corrected Groundwater Level (ft-MSL)	2404.00	2403.98	2407.29	2407.52	2407.59	2407.86	2408.01	2408.30	2408.46	2408.42	2408.36	2408.57
Well >	MW-76A	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Program>	BICA/Site H	Groundwater Level (ft-bTOC)	115.20	115.12	114.59	114.40	114.33	114.06	113.94	113.64	113.48	113.50	113.58	113.33
Type >	Background	Groundwater Level (ft-MSL)	2403.79	2403.87	2407.30	2407.49	2407.56	2407.83	2407.95	2408.25	2408.41	2408.39	2408.31	2408.56
		Corrected Groundwater Level (ft-MSL)	2403.79	2403.87	2407.30	2407.49	2407.56	2407.83	2407.95	2408.25	2408.41	2408.39	2408.31	2408.56
Well >	MW-77	LNAPL Thickness (feet)	nm	0.00	0.00	0.00	nm	0.00	nm	0.00	0.00	0.00	0.00	0.00
Program>	SITE H	Groundwater Level (ft-bTOC)	nm	107.96	107.51	106.91	nm	106.82	nm	106.25	106.07	106.15	106.18	105.89
Type >	POC	Groundwater Level (ft-MSL)	nm	2400.81	2404.08	2404.68	nm	2404.77	nm	2405.34	2405.52	2405.44	2405.41	2405.70
		Corrected Groundwater Level (ft-MSL)	nm	2400.81	2404.08	2404.68	nm	2404.77	nm	2405.34	2405.52	2405.44	2405.41	2405.70
Well >	MW-77A	LNAPL Thickness (feet)	nm	0.00	0.00	0.00	nm	0.00	nm	0.00	0.00	0.00	0.00	0.00
Program>	SITE H	Groundwater Level (ft-bTOC)	nm	108.71	108.25	107.17	nm	106.85	nm	106.95	106.76	106.98	106.89	106.59
Type >	POC	Groundwater Level (ft-MSL)	nm	2400.28	2403.61	2404.69	nm	2405.01	nm	2404.91	2405.10	2404.88	2404.97	2405.27
		Corrected Groundwater Level (ft-MSL)	nm	2400.28	2403.61	2404.69	nm	2405.01	nm	2404.91	2405.10	2404.88	2404.97	2405.27
Well >	MW-78	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Program>	BICA	Groundwater Level (ft-bTOC)	48.90	49.29	47.38	47.48	47.07	46.38	47.29	48.68	48.91	50.32	48.67	47.28
Type >	POC	Groundwater Level (ft-MSL)	2367.00	2366.61	2371.21	2371.11	2371.52	2372.21	2371.30	2369.91	2369.68	2368.27	2369.92	2371.31
		Corrected Groundwater Level (ft-MSL)	2367.00	2366.61	2371.21	2371.11	2371.52	2372.21	2371.30	2369.91	2369.68	2368.27	2369.92	2371.31
Well >	MW-78A	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Program>	BICA	Groundwater Level (ft-bTOC)	49.24	49.56	47.78	48.87	47.45	46.80	48.12	49.12	49.19	50.58	48.99	47.67
Type >	POC	Groundwater Level (ft-MSL)	2366.95	2366.63	2371.07	2369.98	2371.40	2372.05	2370.73	2369.73	2369.66	2368.27	2369.86	2371.18
		Corrected Groundwater Level (ft-MSL)	2366.95	2366.63	2371.07	2369.98	2371.40	2372.05	2370.73	2369.73	2369.66	2368.27	2369.86	2371.18
Well >	MW-79	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Program>	BICA	Groundwater Level (ft-bTOC)	68.82	68.43	66.94	67.02	66.66	66.11	67.77	68.79	69.27	70.12	69.00	67.62
Type >	POC	Groundwater Level (ft-MSL)	2367.39	2367.78	2372.13	2372.05	2372.41	2372.96	2371.30	2370.28	2369.80	2368.95	2370.07	2371.45
		Corrected Groundwater Level (ft-MSL)	2367.39	2367.78	2372.13	2372.05	2372.41	2372.96	2371.30	2370.28	2369.80	2368.95	2370.07	2371.45
Well >	MW-79A	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Program>	BICA	Groundwater Level (ft-bTOC)	68.57	68.73	66.74	66.89	66.68	66.09	67.84	68.86	69.05	69.92	68.65	67.54
Type >	POC	Groundwater Level (ft-MSL)	2367.44	2367.28	2372.00	2371.85	2372.06	2372.65	2370.90	2369.88	2369.69	2368.82	2370.09	2371.20
		Corrected Groundwater Level (ft-MSL)	2367.44	2367.28	2372.00	2371.85	2372.06	2372.65	2370.90	2369.88	2369.69	2368.82	2370.09	2371.20
Well >	MW-80	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Program>	BICA	Groundwater Level (ft-bTOC)	66.44	66.67	64.89	65.01	64.51	63.36	65.31	65.86	66.67	67.33	66.69	64.41
Type >	POC	Groundwater Level (ft-MSL)	2374.11	2373.88	2378.41	2378.29	2378.79	2379.94	2377.99	2377.44	2376.63	2375.97	2376.61	2378.89
		Corrected Groundwater Level (ft-MSL)	2374.11	2373.88	2378.41	2378.29	2378.79	2379.94	2377.99	2377.44	2376.63	2375.97	2376.61	2378.89
Well >	MW-80A	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Program>	BICA	Groundwater Level (ft-bTOC)	65.41	65.62	64.02	64.03	63.52	62.39	64.42	64.88	65.72	66.40	65.73	63.46
Type >	POC	Groundwater Level (ft-MSL)	2374.44	2374.23	2378.69	2378.68	2379.19	2380.32	2378.29	2377.83	2376.99	2376.31	2376.98	2379.25
		Corrected Groundwater Level (ft-MSL)	2374.44	2374.23	2378.69	2378.68	2379.19	2380.32	2378.29	2377.83	2376.99	2376.31	2376.98	2379.25

Table VI.B.2.b. - Historical Monitor Well Water Levels

Alon USA Big Spring Refinery [CP-50140]

			FLUID LEVEL MEASUREMENT EVENTS									STATISTICS		
		Data	Jan-20	Jul-20	Jan-21	Jul-21	Jan-22	Jul-22	Jan-23	Jul-23	Jan-24	Maximum	Minimum	Average
Well >	MW-76	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**	**0.00**
Program>	BICA/Site H	Groundwater Level (ft-bTOC)	113.64	113.59	113.63	113.84	114.25	114.61	115.02	115.24	115.82	**115.82**	**113.59**	**114.39**
Type >	Background	Groundwater Level (ft-MSL)	2408.57	2408.62	2408.58	2408.37	2407.96	2407.60	2407.19	2406.97	2406.39	**2408.62**	**2403.98**	**2407.55**
		Corrected Groundwater Level (ft-MSL)	2408.57	2408.62	2408.58	2408.37	2407.96	2407.60	2407.19	2406.97	2406.39	**2408.62**	**2403.98**	**2407.55**
Well >	MW-76A	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**	**0.00**
Program>	BICA/Site H	Groundwater Level (ft-bTOC)	113.32	113.30	113.35	113.56	113.95	114.31	114.75	114.98	115.51	**115.51**	**113.30**	**114.10**
Type >	Background	Groundwater Level (ft-MSL)	2408.57	2408.59	2408.54	2408.33	2407.94	2407.58	2407.14	2406.91	2406.38	**2408.59**	**2403.79**	**2407.51**
		Corrected Groundwater Level (ft-MSL)	2408.57	2408.59	2408.54	2408.33	2407.94	2407.58	2407.14	2406.91	2406.38	**2408.59**	**2403.79**	**2407.51**
Well >	MW-77	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**	**0.00**
Program>	SITE H	Groundwater Level (ft-bTOC)	105.97	105.93	106.07	106.08	106.14	106.14	106.26	106.15	106.78	**107.96**	**105.89**	**106.40**
Type >	POC	Groundwater Level (ft-MSL)	2405.62	2405.66	2405.52	2405.51	2405.45	2405.45	2405.33	2405.44	2404.81	**2405.70**	**2400.81**	**2405.03**
		Corrected Groundwater Level (ft-MSL)	2405.62	2405.66	2405.52	2405.51	2405.45	2405.45	2405.33	2405.44	2404.81	**2405.70**	**2400.81**	**2405.03**
Well >	MW-77A	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**	**0.00**
Program>	SITE H	Groundwater Level (ft-bTOC)	106.75	106.75	106.86	108.88	106.81	106.72	106.73	106.70	107.37	**108.88**	**106.59**	**107.15**
Type >	POC	Groundwater Level (ft-MSL)	2405.11	2405.11	2405.00	2402.98	2405.05	2405.14	2405.13	2405.16	2404.49	**2405.27**	**2400.28**	**2404.55**
		Corrected Groundwater Level (ft-MSL)	2405.11	2405.11	2405.00	2402.98	2405.05	2405.14	2405.13	2405.16	2404.49	**2405.27**	**2400.28**	**2404.55**
Well >	MW-78	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**	**0.00**
Program>	BICA	Groundwater Level (ft-bTOC)	47.64	47.34	47.42	46.22	46.92	47.19	46.87	47.34	47.70	**50.32**	**46.22**	**47.73**
Type >	POC	Groundwater Level (ft-MSL)	2370.95	2371.25	2371.17	2372.37	2371.67	2371.40	2371.72	2371.25	2370.89	**2372.37**	**2366.61**	**2370.61**
		Corrected Groundwater Level (ft-MSL)	2370.95	2371.25	2371.17	2372.37	2371.67	2371.40	2371.72	2371.25	2370.89	**2372.37**	**2366.61**	**2370.61**
Well >	MW-78A	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**	**0.00**
Program>	BICA	Groundwater Level (ft-bTOC)	47.99	47.70	47.78	46.60	47.24	47.55	47.21	47.69	48.04	**50.58**	**46.60**	**48.15**
Type >	POC	Groundwater Level (ft-MSL)	2370.86	2371.15	2371.07	2372.25	2371.61	2371.30	2371.64	2371.16	2370.81	**2372.25**	**2366.63**	**2370.45**
		Corrected Groundwater Level (ft-MSL)	2370.86	2371.15	2371.07	2372.25	2371.61	2371.30	2371.64	2371.16	2370.81	**2372.25**	**2366.63**	**2370.45**
Well >	MW-79	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**	**0.00**
Program>	BICA	Groundwater Level (ft-bTOC)	67.95	67.10	66.95	65.24	65.96	65.59	65.96	66.21	66.88	**70.12**	**65.24**	**67.35**
Type >	POC	Groundwater Level (ft-MSL)	2371.12	2371.97	2372.12	2373.83	2373.11	2373.48	2373.11	2372.86	2372.19	**2373.83**	**2367.39**	**2371.45**
		Corrected Groundwater Level (ft-MSL)	2371.12	2371.97	2372.12	2373.83	2373.11	2373.48	2373.11	2372.86	2372.19	**2373.83**	**2367.39**	**2371.45**
Well >	MW-79A	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**	**0.00**
Program>	BICA	Groundwater Level (ft-bTOC)	67.76	66.99	66.71	65.10	65.79	65.56	65.77	66.19	66.67	**69.92**	**65.10**	**67.24**
Type >	POC	Groundwater Level (ft-MSL)	2370.98	2371.75	2372.03	2373.64	2372.95	2373.18	2372.97	2372.55	2372.07	**2373.64**	**2367.28**	**2371.24**
		Corrected Groundwater Level (ft-MSL)	2370.98	2371.75	2372.03	2373.64	2372.95	2373.18	2372.97	2372.55	2372.07	**2373.64**	**2367.28**	**2371.24**
Well >	MW-80	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**	**0.00**
Program>	BICA	Groundwater Level (ft-bTOC)	65.33	64.61	65.16	63.43	63.92	63.98	63.58	64.06	64.99	**67.33**	**63.36**	**65.06**
Type >	POC	Groundwater Level (ft-MSL)	2377.97	2378.69	2378.14	2379.87	2379.38	2379.32	2379.72	2379.24	2378.31	**2379.94**	**2373.88**	**2377.98**
		Corrected Groundwater Level (ft-MSL)	2377.97	2378.69	2378.14	2379.87	2379.38	2379.32	2379.72	2379.24	2378.31	**2379.94**	**2373.88**	**2377.98**
Well >	MW-80A	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**	**0.00**
Program>	BICA	Groundwater Level (ft-bTOC)	64.40	63.66	64.21	62.47	62.93	62.93	62.54	63.02	63.95	**66.40**	**62.39**	**64.08**
Type >	POC	Groundwater Level (ft-MSL)	2378.31	2379.05	2378.50	2380.24	2379.78	2379.78	2380.17	2379.69	2378.76	**2380.32**	**2374.23**	**2378.36**
		Corrected Groundwater Level (ft-MSL)	2378.31	2379.05	2378.50	2380.24	2379.78	2379.78	2380.17	2379.69	2378.76	**2380.32**	**2374.23**	**2378.36**

ft-TOC : Feet Below Top of Casing, ft-MSL : Feet Mean Sea Level, POC : Point of Compliance

Table VI.B.2.b. - Historical Monitor Well Water Levels

Alon USA Big Spring Refinery [CP-50140]

		Data	FLUID LEVEL MEASUREMENT EVENTS											
			Jan-14	Jul-14	Mar-15	Jul-15	Jan-16	Jul-16	Jan-17	Jul-17	Jan-18	Jul-18	Jan-19	Jul-19
Well >	RW-106	LNAPL Thickness (feet)	0.04	0.14	0.14	0.03	0.00	0.30	0.00	2.40	3.30	3.71	3.00	0.93
Program>	BICA	Groundwater Level (ft-bTOC)	57.30	57.70	55.29	55.13	54.04	52.68	55.96	57.80	59.60	60.69	59.60	55.41
Type >	Recovery	Groundwater Level (ft-MSL)	2383.11	2382.71	2387.38	2387.54	2388.63	2389.99	2386.71	2384.87	2383.07	2381.98	2383.07	2387.26
		Corrected Groundwater Level (ft-MSL)	2383.14	2382.82	2387.49	2387.56	2388.63	2390.23	2386.71	2386.86	2385.81	2385.06	2385.56	2388.03
Well >	MW-109	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Program>	BICA	Groundwater Level (ft-bTOC)	7.24	7.99	6.77	7.28	6.61	7.01	6.68	8.07	7.15	8.02	7.10	7.55
Type >	POC	Groundwater Level (ft-MSL)	2360.44	2359.69	2363.94	2363.43	2364.10	2363.70	2364.03	2362.64	2363.56	2362.69	2363.61	2363.16
		Corrected Groundwater Level (ft-MSL)	2360.44	2359.69	2363.94	2363.43	2364.10	2363.70	2364.03	2362.64	2363.56	2362.69	2363.61	2363.16
Well >	MW-109A	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Program>	BICA	Groundwater Level (ft-bTOC)	6.80	7.63	6.34	6.85	6.21	6.61	6.25	7.62	6.72	7.65	6.70	7.12
Type >	POC	Groundwater Level (ft-MSL)	2360.68	2359.85	2364.13	2363.62	2364.26	2363.86	2364.22	2362.85	2363.75	2362.82	2363.77	2363.35
		Corrected Groundwater Level (ft-MSL)	2360.68	2359.85	2364.13	2363.62	2364.26	2363.86	2364.22	2362.85	2363.75	2362.82	2363.77	2363.35
Well >	RW-112	LNAPL Thickness (feet)	nm	nm	nm	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Program>	BICA	Groundwater Level (ft-bTOC)	nm	nm	nm	16.10	15.61	14.96	16.83	24.18	17.86	25.93	17.31	15.94
Type >	POC	Groundwater Level (ft-MSL)	nm	nm	nm	2371.38	2371.87	2372.52	2370.65	2363.30	2369.62	2361.55	2370.17	2371.54
		Corrected Groundwater Level (ft-MSL)	nm	nm	nm	2371.38	2371.87	2372.52	2370.65	2363.30	2369.62	2361.55	2370.17	2371.54
Well >	MW-125	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Program>	BICA	Groundwater Level (ft-bTOC)	67.30	67.41	67.01	67.17	66.96	66.96	66.89	67.46	67.31	67.85	67.50	67.37
Type >	POC	Groundwater Level (ft-MSL)	2370.78	2370.67	2373.97	2373.81	2374.02	2374.02	2374.09	2373.52	2373.67	2373.13	2373.48	2373.61
		Corrected Groundwater Level (ft-MSL)	2370.78	2370.67	2373.97	2373.81	2374.02	2374.02	2374.09	2373.52	2373.67	2373.13	2373.48	2373.61
Well >	MW-125A	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Program>	BICA	Groundwater Level (ft-bTOC)	67.14	67.24	66.85	67.02	66.81	66.80	66.74	67.32	67.15	67.69	67.34	67.21
Type >	POC	Groundwater Level (ft-MSL)	2370.84	2370.74	2373.96	2373.79	2374.00	2374.01	2374.07	2373.49	2373.66	2373.12	2373.47	2373.60
		Corrected Groundwater Level (ft-MSL)	2370.84	2370.74	2373.96	2373.79	2374.00	2374.01	2374.07	2373.49	2373.66	2373.12	2373.47	2373.60
Well >	RW-141	LNAPL Thickness (feet)	nm	nm	nm	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Program>	BICA	Groundwater Level (ft-bTOC)	nm	nm	nm	36.54	36.41	36.11	36.28	37.08	36.88	37.58	36.89	36.60
Type >	Recovery	Groundwater Level (ft-MSL)	nm	nm	nm	2369.71	2369.84	2370.14	2369.97	2369.17	2369.37	2368.67	2369.36	2369.65
		Corrected Groundwater Level (ft-MSL)	nm	nm	nm	2369.71	2369.84	2370.14	2369.97	2369.17	2369.37	2368.67	2369.36	2369.65
Well >	RW-142	LNAPL Thickness (feet)	nm	nm	nm	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Program>	BICA	Groundwater Level (ft-bTOC)	nm	nm	nm	63.87	63.71	62.93	63.97	64.78	64.92	65.95	64.88	63.72
Type >	Recovery	Groundwater Level (ft-MSL)	nm	nm	nm	2372.82	2372.98	2373.76	2372.72	2371.91	2371.77	2370.74	2371.81	2372.97
		Corrected Groundwater Level (ft-MSL)	nm	nm	nm	2372.82	2372.98	2373.76	2372.72	2371.91	2371.77	2370.74	2371.81	2372.97
Well >	RW-144	LNAPL Thickness (feet)	nm	nm	nm	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Program>	BICA	Groundwater Level (ft-bTOC)	nm	nm	nm	67.85	68.26	67.64	68.67	69.67	70.26	70.68	70.49	69.53
Type >	Recovery	Groundwater Level (ft-MSL)	nm	nm	nm	2372.83	2372.42	2373.04	2372.01	2371.01	2370.42	2370.00	2370.19	2371.15
		Corrected Groundwater Level (ft-MSL)	nm	nm	nm	2372.83	2372.42	2373.04	2372.01	2371.01	2370.42	2370.00	2370.19	2371.15
Well >	RW-145	LNAPL Thickness (feet)	nm	0.00	nm	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Program>	BICA	Groundwater Level (ft-bTOC)	nm	60.19	nm	59.62	60.48	59.41	64.09	64.54	60.89	61.32	61.34	60.47
Type >	Recovery	Groundwater Level (ft-MSL)	nm	2369.06	nm	2372.26	2371.40	2372.47	2367.79	3367.34	3370.99	3370.56	3370.54	2371.41
		Corrected Groundwater Level (ft-MSL)	nm	2369.06	nm	2372.26	2371.40	2372.47	2367.79	3367.34	3370.99	3370.56	3370.54	2371.41

ft-TOC : Feet Below Top of Casing, ft-MSL : Feet Mean Sea Level, POC : Point of Compliance

Table VI.B.2.b. - Historical Monitor Well Water Levels

Alon USA Big Spring Refinery [CP-50140]

		Data	FLUID LEVEL MEASUREMENT EVENTS									STATISTICS		
			Jan-20	Jul-20	Jan-21	Jul-21	Jan-22	Jul-22	Jan-23	Jul-23	Jan-24	Maximum	Minimum	Average
Well >	RW-106	LNAPL Thickness (feet)	0.05	0.75	1.20	0.00	0.94	0.19	0.12	0.19	1.03	3.71	0.00	0.88
Program>	BICA	Groundwater Level (ft-bTOC)	55.58	55.30	56.04	52.70	54.47	53.31	52.83	53.37	55.28	60.69	52.68	55.72
Type >	Recovery	Groundwater Level (ft-MSL)	2387.09	2387.37	2386.63	2389.97	2388.20	2389.36	2389.84	2389.30	2387.39	2389.99	2381.98	2386.74
		Corrected Groundwater Level (ft-MSL)	2387.13	2387.99	2387.63	2389.97	2388.95	2389.51	2389.94	2389.45	2388.21	2390.23	2382.82	2387.46
Well >	MW-109	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Program>	BICA	Groundwater Level (ft-bTOC)	6.89	6.92	6.65	6.58	6.60	7.45	6.51	7.51	6.65	8.07	6.51	7.11
Type >	POC	Groundwater Level (ft-MSL)	2363.82	2363.79	2364.06	2364.13	2364.11	2363.26	2364.20	2363.20	2364.06	2364.20	2359.69	2363.32
		Corrected Groundwater Level (ft-MSL)	2363.82	2363.79	2364.06	2364.13	2364.11	2363.26	2364.20	2363.20	2364.06	2364.20	2359.69	2363.32
Well >	MW-109A	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Program>	BICA	Groundwater Level (ft-bTOC)	6.45	6.54	6.24	6.13	6.15	7.00	6.08	7.07	6.23	7.65	6.08	6.69
Type >	POC	Groundwater Level (ft-MSL)	2364.02	2363.93	2364.23	2364.34	2364.32	2363.47	2364.39	2363.40	2364.24	2364.39	2359.85	2363.50
		Corrected Groundwater Level (ft-MSL)	2364.02	2363.93	2364.23	2364.34	2364.32	2363.47	2364.39	2363.40	2364.24	2364.39	2359.85	2363.50
Well >	RW-112	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Program>	BICA	Groundwater Level (ft-bTOC)	16.20	15.78	18.08	16.94	17.98	18.03	17.63	15.98	16.28	25.93	14.96	17.65
Type >	POC	Groundwater Level (ft-MSL)	2371.28	2371.70	2369.40	2370.54	2369.50	2369.45	2369.85	2371.50	2371.20	2372.52	2361.55	2369.83
		Corrected Groundwater Level (ft-MSL)	2371.28	2371.70	2369.40	2370.54	2369.50	2369.45	2369.85	2371.50	2371.20	2372.52	2361.55	2369.83
Well >	MW-125	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Program>	BICA	Groundwater Level (ft-bTOC)	67.16	67.23	67.04	66.48	66.28	66.75	66.45	66.68	66.39	67.85	66.28	67.03
Type >	POC	Groundwater Level (ft-MSL)	2373.82	2373.75	2373.94	2374.50	2374.70	2374.23	2374.53	2374.30	2374.59	2374.70	2370.67	2373.67
		Corrected Groundwater Level (ft-MSL)	2373.82	2373.75	2373.94	2374.50	2374.70	2374.23	2374.53	2374.30	2374.59	2374.70	2370.67	2373.67
Well >	MW-125A	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Program>	BICA	Groundwater Level (ft-bTOC)	67.00	67.06	66.88	66.33	66.12	66.60	66.29	66.52	66.24	67.69	66.12	66.87
Type >	POC	Groundwater Level (ft-MSL)	2373.81	2373.75	2373.93	2374.48	2374.69	2374.21	2374.52	2374.29	2374.57	2374.69	2370.74	2373.67
		Corrected Groundwater Level (ft-MSL)	2373.81	2373.75	2373.93	2374.48	2374.69	2374.21	2374.52	2374.29	2374.57	2374.69	2370.74	2373.67
Well >	RW-141	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Program>	BICA	Groundwater Level (ft-bTOC)	36.56	36.52	36.37	35.96	36.15	36.57	36.03	36.58	36.30	37.58	35.96	36.52
Type >	Recovery	Groundwater Level (ft-MSL)	2369.69	2369.73	2369.88	2370.29	2370.10	2369.68	2370.22	2369.67	2369.95	2370.29	2368.67	2369.73
		Corrected Groundwater Level (ft-MSL)	2369.69	2369.73	2369.88	2370.29	2370.10	2369.68	2370.22	2369.67	2369.95	2370.29	2368.67	2369.73
Well >	RW-142	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Program>	BICA	Groundwater Level (ft-bTOC)	64.01	63.75	63.78	62.88	63.34	63.58	63.26	63.68	63.92	65.95	62.88	63.94
Type >	Recovery	Groundwater Level (ft-MSL)	2372.68	2372.94	2372.91	2373.81	2373.35	2373.11	2373.43	2373.01	2372.77	2373.81	2370.74	2372.75
		Corrected Groundwater Level (ft-MSL)	2372.68	2372.94	2372.91	2373.81	2373.35	2373.11	2373.43	2373.01	2372.77	2373.81	2370.74	2372.75
Well >	RW-144	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Program>	BICA	Groundwater Level (ft-bTOC)	69.03	67.73	78.33	77.23	65.86	64.58	65.79	66.39	66.22	78.33	64.58	69.12
Type >	Recovery	Groundwater Level (ft-MSL)	2371.65	2372.95	2362.35	2363.45	2374.82	2376.10	2374.89	2374.29	2374.46	2376.10	2362.35	2371.56
		Corrected Groundwater Level (ft-MSL)	2371.65	2372.95	2362.35	2363.45	2374.82	2376.10	2374.89	2374.29	2374.46	2376.10	2362.35	2371.56
Well >	RW-145	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Program>	BICA	Groundwater Level (ft-bTOC)	60.21	59.15	58.84	57.22	56.55	55.59	56.85	57.28	57.18	64.54	55.59	59.54
Type >	Recovery	Groundwater Level (ft-MSL)	2371.67	2372.73	2373.04	2374.66	2375.33	2376.29	2375.03	2374.60	2374.70	3370.99	2367.79	2582.73
		Corrected Groundwater Level (ft-MSL)	2371.67	2372.73	2373.04	2374.66	2375.33	2376.29	2375.03	2374.60	2374.70	3370.99	2367.79	2582.73

ft-TOC : Feet Below Top of Casing, ft-MSL : Feet Mean Sea Level, POC : Point of Compliance

Table VI.B.2.b. - Historical Monitor Well Water Levels

Alon USA Big Spring Refinery [CP-50140]

		Data	FLUID LEVEL MEASUREMENT EVENTS											
			Jan-14	Jul-14	Mar-15	Jul-15	Jan-16	Jul-16	Jan-17	Jul-17	Jan-18	Jul-18	Jan-19	Jul-19
Well >	RW-146	LNAPL Thickness (feet)	nm	nm	nm	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Program>	BICA	Groundwater Level (ft-bTOC)	nm	nm	nm	63.56	63.67	63.64	63.67	64.23	64.66	65.47	65.62	64.64
Type >	Recovery	Groundwater Level (ft-MSL)	nm	nm	nm	2377.92	2377.81	2377.84	2377.81	2377.25	2376.82	2376.01	2375.86	2376.84
		Corrected Groundwater Level (ft-MSL)	nm	nm	nm	2377.92	2377.81	2377.84	2377.81	2377.25	2376.82	2376.01	2375.86	2376.84
Well >	RW-147	LNAPL Thickness (feet)	nm	nm	nm	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Program>	BICA	Groundwater Level (ft-bTOC)	nm	nm	nm	67.48	67.57	76.29	67.32	67.94	68.43	81.87	81.94	69.27
Type >	Recovery	Groundwater Level (ft-MSL)	nm	nm	nm	2380.92	2380.83	2372.11	2381.08	2380.46	2379.97	2366.53	2366.46	2379.13
		Corrected Groundwater Level (ft-MSL)	nm	nm	nm	2380.92	2380.83	2372.11	2381.08	2380.46	2379.97	2366.53	2366.46	2379.13
Well >	IW-149	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Program>	BICA	Groundwater Level (ft-bTOC)	64.91	63.95	63.66	63.15	63.15	63.02	63.10	63.51	63.98	64.58	64.95	63.98
Type >	POC	Groundwater Level (ft-MSL)	2372.11	2373.07	2376.51	2377.02	2377.02	2377.15	2377.07	2376.66	2376.19	2375.59	2375.22	2376.19
		Corrected Groundwater Level (ft-MSL)	2372.11	2373.07	2376.51	2377.02	2377.02	2377.15	2377.07	2376.66	2376.19	2375.59	2375.22	2376.19
Well >	IW-149A	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Program>	BICA	Groundwater Level (ft-bTOC)	64.68	63.74	63.40	62.89	62.86	62.81	62.82	63.29	63.71	64.41	64.76	63.78
Type >	POC	Groundwater Level (ft-MSL)	2372.33	2373.27	2376.83	2377.34	2377.37	2377.42	2377.41	2376.94	2376.52	2375.82	2375.47	2376.45
		Corrected Groundwater Level (ft-MSL)	2372.33	2373.27	2376.83	2377.34	2377.37	2377.42	2377.41	2376.94	2376.52	2375.82	2375.47	2376.45
Well >	IW-150	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Program>	BICA	Groundwater Level (ft-bTOC)	34.22	34.61	33.92	34.04	33.78	33.76	33.75	34.76	34.48	35.11	34.20	34.18
Type >	POC	Groundwater Level (ft-MSL)	2357.39	2357.00	2360.87	2360.75	2361.01	2361.03	2361.04	2360.03	2360.31	2359.68	2360.59	2360.61
		Corrected Groundwater Level (ft-MSL)	2357.39	2357.00	2360.87	2360.75	2361.01	2361.03	2361.04	2360.03	2360.31	2359.68	2360.59	2360.61
Well >	IW-150A	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Program>	BICA	Groundwater Level (ft-bTOC)	34.32	34.79	33.95	34.19	33.85	33.85	33.88	34.91	34.55	35.20	34.29	34.30
Type >	POC	Groundwater Level (ft-MSL)	2357.29	2356.82	2360.88	2360.64	2360.98	2360.98	2360.95	2359.92	2360.28	2359.63	2360.54	2360.53
		Corrected Groundwater Level (ft-MSL)	2357.29	2356.82	2360.88	2360.64	2360.98	2360.98	2360.95	2359.92	2360.28	2359.63	2360.54	2360.53
Well >	MW-152	LNAPL Thickness (feet)	0.00	0.00	0.00	4.38	4.09	3.40	3.13	3.13	3.14	3.72	3.24	2.81
Program>	BICA	Groundwater Level (ft-bTOC)	87.47	87.61	82.58	86.91	86.52	85.60	85.08	85.08	85.02	86.00	85.26	84.63
Type >	POC	Groundwater Level (ft-MSL)	2385.74	2385.60	2393.28	2388.95	2389.34	2390.26	2390.78	2390.78	2390.84	2389.86	2390.60	2391.23
		Corrected Groundwater Level (ft-MSL)	2385.74	2385.60	2393.28	2392.32	2392.49	2392.88	2393.19	2393.25	2393.32	2392.80	2393.16	2393.45
Well >	MW-152A	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Program>	BICA	Groundwater Level (ft-bTOC)	83.21	83.90	83.52	83.47	83.31	82.90	82.60	82.61	82.52	83.05	82.87	82.38
Type >	POC	Groundwater Level (ft-MSL)	2389.99	2389.30	2392.34	2392.39	2392.55	2392.96	2393.26	2393.25	2393.34	2392.81	2392.99	2393.48
		Corrected Groundwater Level (ft-MSL)	2389.99	2389.30	2392.34	2392.39	2392.55	2392.96	2393.26	2393.25	2393.34	2392.81	2392.99	2393.48
Well >	MW-153	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Program>	BICA	Groundwater Level (ft-bTOC)	65.94	66.51	65.69	65.78	65.56	64.99	64.65	65.13	64.58	65.75	64.78	64.42
Type >	POC	Groundwater Level (ft-MSL)	2387.44	2386.87	2390.50	2390.41	2390.63	2391.20	2391.54	2391.06	2391.61	2390.44	2391.41	2391.77
		Corrected Groundwater Level (ft-MSL)	2387.44	2386.87	2390.50	2390.41	2390.63	2391.20	2391.54	2391.06	2391.61	2390.44	2391.41	2391.77
Well >	MW-153A	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Program>	BICA	Groundwater Level (ft-bTOC)	66.08	66.70	65.80	65.90	65.64	65.11	64.74	65.25	64.69	65.87	64.95	64.53
Type >	POC	Groundwater Level (ft-MSL)	2387.57	2386.95	2390.54	2390.44	2390.70	2391.23	2391.60	2391.09	2391.65	2390.47	2391.39	2391.81
		Corrected Groundwater Level (ft-MSL)	2387.57	2386.95	2390.54	2390.44	2390.70	2391.23	2391.60	2391.09	2391.65	2390.47	2391.39	2391.81

ft-TOC : Feet Below Top of Casing, ft-MSL : Feet Mean Sea Level, POC : Point of Compliance

Table VI.B.2.b. - Historical Monitor Well Water Levels

Alon USA Big Spring Refinery [CP-50140]

		Data	FLUID LEVEL MEASUREMENT EVENTS									STATISTICS		
			Jan-20	Jul-20	Jan-21	Jul-21	Jan-22	Jul-22	Jan-23	Jul-23	Jan-24	Maximum	Minimum	Average
Well >	RW-146	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**	**0.00**
Program>	BICA	Groundwater Level (ft-bTOC)	64.39	63.09	62.82	61.58	60.69	59.94	60.62	61.27	61.20	**65.62**	**59.94**	**63.04**
Type >	Recovery	Groundwater Level (ft-MSL)	2377.09	2378.39	2378.66	2379.90	2380.79	2381.54	2380.86	2380.21	2380.28	**2381.54**	**2375.86**	**2378.44**
		Corrected Groundwater Level (ft-MSL)	2377.09	2378.39	2378.66	2379.90	2380.79	2381.54	2380.86	2380.21	2380.28	**2381.54**	**2375.86**	**2378.44**
Well >	RW-147	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**	**0.00**
Program>	BICA	Groundwater Level (ft-bTOC)	68.41	67.13	66.90	65.92	65.24	64.88	64.84	65.35	65.37	**81.94**	**64.84**	**69.01**
Type >	Recovery	Groundwater Level (ft-MSL)	2379.99	2381.27	2381.50	2382.48	2383.16	2383.52	2383.56	2383.05	2383.03	**2383.56**	**2366.46**	**2379.39**
		Corrected Groundwater Level (ft-MSL)	2379.99	2381.27	2381.50	2382.48	2383.16	2383.52	2383.56	2383.05	2383.03	**2383.56**	**2366.46**	**2379.39**
Well >	IW-149	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**	**0.00**
Program>	BICA	Groundwater Level (ft-bTOC)	63.83	62.95	62.64	61.69	60.84	60.52	60.59	61.13	61.10	**64.95**	**60.52**	**62.92**
Type >	POC	Groundwater Level (ft-MSL)	2376.34	2377.22	2377.53	2378.48	2379.33	2379.65	2379.58	2379.04	2379.07	**2379.65**	**2372.11**	**2376.95**
		Corrected Groundwater Level (ft-MSL)	2376.34	2377.22	2377.53	2378.48	2379.33	2379.65	2379.58	2379.04	2379.07	**2379.65**	**2372.11**	**2376.95**
Well >	IW-149A	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**	**0.00**
Program>	BICA	Groundwater Level (ft-bTOC)	63.61	62.75	62.46	61.50	60.65	60.37	60.39	60.92	60.88	**64.76**	**60.37**	**62.70**
Type >	POC	Groundwater Level (ft-MSL)	2376.62	2377.48	2377.77	2378.73	2379.58	2379.86	2379.84	2379.31	2379.35	**2379.86**	**2372.33**	**2377.22**
		Corrected Groundwater Level (ft-MSL)	2376.62	2377.48	2377.77	2378.73	2379.58	2379.86	2379.84	2379.31	2379.35	**2379.86**	**2372.33**	**2377.22**
Well >	IW-150	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**	**0.00**
Program>	BICA	Groundwater Level (ft-bTOC)	34.20	34.21	33.91	33.24	33.45	33.71	33.18	33.71	33.34	**35.11**	**33.18**	**33.99**
Type >	POC	Groundwater Level (ft-MSL)	2360.59	2360.58	2360.88	2361.55	2361.34	2361.08	2361.61	2361.08	2361.45	**2361.61**	**2357.00**	**2360.50**
		Corrected Groundwater Level (ft-MSL)	2360.59	2360.58	2360.88	2361.55	2361.34	2361.08	2361.61	2361.08	2361.45	**2361.61**	**2357.00**	**2360.50**
Well >	IW-150A	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**	**0.00**
Program>	BICA	Groundwater Level (ft-bTOC)	34.32	34.33	34.06	33.38	33.60	33.85	33.30	33.89	33.49	**35.20**	**33.30**	**34.11**
Type >	POC	Groundwater Level (ft-MSL)	2360.51	2360.50	2360.77	2361.45	2361.23	2360.98	2361.53	2360.94	2361.34	**2361.53**	**2356.82**	**2360.41**
		Corrected Groundwater Level (ft-MSL)	2360.51	2360.50	2360.77	2361.45	2361.23	2360.98	2361.53	2360.94	2361.34	**2361.53**	**2356.82**	**2360.41**
Well >	MW-152	LNAPL Thickness (feet)	3.44	3.25	0.88	1.44	1.00	1.20	1.57	1.06	1.32	**4.38**	**0.00**	**2.20**
Program>	BICA	Groundwater Level (ft-bTOC)	85.49	85.14	82.64	82.81	83.55	82.27	82.67	81.81	81.99	**87.61**	**81.81**	**84.58**
Type >	POC	Groundwater Level (ft-MSL)	2390.37	2390.72	2393.22	2393.05	2392.31	2393.59	2393.19	2394.05	2393.87	**2394.05**	**2385.60**	**2391.03**
		Corrected Groundwater Level (ft-MSL)	2393.09	2393.29	2393.92	2394.19	2393.10	2394.54	2394.43	2394.89	2394.93	**2394.93**	**2385.60**	**2392.75**
Well >	MW-152A	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**	**0.00**
Program>	BICA	Groundwater Level (ft-bTOC)	82.75	82.54	81.86	81.85	81.89	81.23	81.42	80.99	81.07	**83.90**	**80.99**	**82.47**
Type >	POC	Groundwater Level (ft-MSL)	2393.11	2393.32	2394.00	2394.01	2393.97	2394.63	2394.44	2394.87	2394.79	**2394.87**	**2389.30**	**2393.13**
		Corrected Groundwater Level (ft-MSL)	2393.11	2393.32	2394.00	2394.01	2393.97	2394.63	2394.44	2394.87	2394.79	**2394.87**	**2389.30**	**2393.13**
Well >	MW-153	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**	**0.00**
Program>	BICA	Groundwater Level (ft-bTOC)	64.91	65.31	65.05	64.50	64.84	64.86	64.74	64.75	63.97	**66.51**	**63.97**	**65.08**
Type >	POC	Groundwater Level (ft-MSL)	2391.28	2390.88	2391.14	2391.69	2391.35	2391.33	2391.45	2391.44	2392.22	**2392.22**	**2386.87**	**2390.84**
		Corrected Groundwater Level (ft-MSL)	2391.28	2390.88	2391.14	2391.69	2391.35	2391.33	2391.45	2391.44	2392.22	**2392.22**	**2386.87**	**2390.84**
Well >	MW-153A	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**	**0.00**
Program>	BICA	Groundwater Level (ft-bTOC)	65.03	65.44	65.18	64.61	64.96	65.03	64.83	64.91	64.10	**66.70**	**64.10**	**65.21**
Type >	POC	Groundwater Level (ft-MSL)	2391.31	2390.90	2391.16	2391.73	2391.38	2391.31	2391.51	2391.43	2392.24	**2392.24**	**2386.95**	**2390.88**
		Corrected Groundwater Level (ft-MSL)	2391.31	2390.90	2391.16	2391.73	2391.38	2391.31	2391.51	2391.43	2392.24	**2392.24**	**2386.95**	**2390.88**

ft-TOC : Feet Below Top of Casing, ft-MSL : Feet Mean Sea Level, POC : Point of Compliance

Table VI.B.2.b. - Historical Monitor Well Water Levels

Alon USA Big Spring Refinery [CP-50140]

		Data	FLUID LEVEL MEASUREMENT EVENTS											
			Jan-14	Jul-14	Mar-15	Jul-15	Jan-16	Jul-16	Jan-17	Jul-17	Jan-18	Jul-18	Jan-19	Jul-19
Well >	MW-154	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Program>	BICA	Groundwater Level (ft-bTOC)	67.58	67.97	67.11	66.94	66.91	66.41	66.22	66.46	66.45	67.27	66.29	65.95
Type >	POC	Groundwater Level (ft-MSL)	2381.33	2380.94	2384.45	2384.62	2384.65	2385.15	2385.34	2385.10	2385.11	2384.29	2385.27	2385.61
		Corrected Groundwater Level (ft-MSL)	2381.33	2380.94	2384.45	2384.62	2384.65	2385.15	2385.34	2385.10	2385.11	2384.29	2385.27	2385.61
Well >	MW-154A	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Program>	BICA	Groundwater Level (ft-bTOC)	67.57	68.00	67.04	60.96	66.90	66.40	66.23	66.48	66.46	67.29	66.33	65.98
Type >	POC	Groundwater Level (ft-MSL)	2381.33	2380.90	2384.54	2390.62	2384.68	2385.18	2385.35	2385.10	2385.12	2384.29	2385.25	2385.60
		Corrected Groundwater Level (ft-MSL)	2381.33	2380.90	2384.54	2390.62	2384.68	2385.18	2385.35	2385.10	2385.12	2384.29	2385.25	2385.60
Well >	MW-155	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Program>	BICA	Groundwater Level (ft-bTOC)	75.42	75.60	75.69	75.63	75.75	75.86	75.81	76.03	76.21	76.46	76.70	76.68
Type >	POC	Groundwater Level (ft-MSL)	2377.28	2377.10	2379.96	2380.02	2379.90	2379.79	2379.84	2379.62	2379.44	2379.19	2378.95	2378.97
		Corrected Groundwater Level (ft-MSL)	2377.28	2377.10	2379.96	2380.02	2379.90	2379.79	2379.84	2379.62	2379.44	2379.19	2378.95	2378.97
Well >	MW-155A	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Program>	BICA	Groundwater Level (ft-bTOC)	74.89	75.11	75.14	75.11	75.19	75.30	75.30	75.50	75.66	75.91	76.12	76.08
Type >	POC	Groundwater Level (ft-MSL)	2377.31	2377.09	2379.97	2380.00	2379.92	2379.81	2379.81	2379.61	2379.45	2379.20	2378.99	2379.03
		Corrected Groundwater Level (ft-MSL)	2377.31	2377.09	2379.97	2380.00	2379.92	2379.81	2379.81	2379.61	2379.45	2379.20	2378.99	2379.03
Well >	MW-163	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Program>	BICA	Groundwater Level (ft-bTOC)	19.20	20.03	18.80	18.92	18.61	18.48	18.17	18.87	18.54	19.51	18.32	18.31
Type >	POC	Groundwater Level (ft-MSL)	2375.25	2374.42	2381.10	2380.98	2381.29	2381.42	2381.73	2381.03	2381.36	2380.39	2381.58	2381.59
		Corrected Groundwater Level (ft-MSL)	2375.25	2374.42	2381.10	2380.98	2381.29	2381.42	2381.73	2381.03	2381.36	2380.39	2381.58	2381.59
Well >	MW-163A	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Program>	BICA	Groundwater Level (ft-bTOC)	19.84	20.63	19.38	19.56	19.23	19.12	18.81	19.47	19.16	20.14	18.95	18.95
Type >	POC	Groundwater Level (ft-MSL)	2377.75	2376.96	2381.18	2381.00	2381.33	2381.44	2381.75	2381.09	2381.40	2380.42	2381.61	2381.61
		Corrected Groundwater Level (ft-MSL)	2377.75	2376.96	2381.18	2381.00	2381.33	2381.44	2381.75	2381.09	2381.40	2380.42	2381.61	2381.61
Well >	MW-165R	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Damaged	
Program>	BICA	Groundwater Level (ft-bTOC)	75.80	76.54	76.28	76.61	76.61	77.00	76.95	77.37	77.33	77.59	Damaged	
Type >	POC	Groundwater Level (ft-MSL)	2374.61	2373.87	2377.06	2376.73	2376.73	2376.34	2376.39	2375.97	2376.01	2375.75	Damaged	
		Corrected Groundwater Level (ft-MSL)	2374.61	2373.87	2377.06	2376.73	2376.73	2376.34	2376.39	2375.97	2376.01	2375.75	Damaged	
Well >	MW-165AR	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Damaged	
Program>	BICA	Groundwater Level (ft-bTOC)	75.59	76.29	76.03	76.41	76.40	76.77	76.80	77.16	77.13	77.41	Damaged	
Type >	POC	Groundwater Level (ft-MSL)	2374.53	2373.83	2376.99	2376.61	2376.62	2376.25	2376.22	2375.86	2375.89	2375.61	Damaged	
		Corrected Groundwater Level (ft-MSL)	2374.53	2373.83	2376.99	2376.61	2376.62	2376.25	2376.22	2375.86	2375.89	2375.61	Damaged	
Well >	MW-166	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Program>	BICA	Groundwater Level (ft-bTOC)	72.80	73.91	73.17	73.82	73.97	74.54	74.52	75.03	74.95	75.21	74.82	74.38
Type >	POC	Groundwater Level (ft-MSL)	2366.49	2365.38	2369.03	2368.38	2368.23	2367.66	2367.68	2367.17	2367.25	2366.99	2367.38	2367.82
		Corrected Groundwater Level (ft-MSL)	2366.49	2365.38	2369.03	2368.38	2368.23	2367.66	2367.68	2367.17	2367.25	2366.99	2367.38	2367.82
Well >	MW-166A	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Program>	BICA	Groundwater Level (ft-bTOC)	72.91	73.85	73.30	74.01	74.11	74.76	74.70	75.17	75.11	75.40	74.89	74.53
Type >	POC	Groundwater Level (ft-MSL)	2366.39	2365.45	2368.91	2368.20	2368.10	2367.45	2367.51	2367.04	2367.10	2366.81	2367.32	2367.68
		Corrected Groundwater Level (ft-MSL)	2366.39	2365.45	2368.91	2368.20	2368.10	2367.45	2367.51	2367.04	2367.10	2366.81	2367.32	2367.68

ft-TOC : Feet Below Top of Casing, ft-MSL : Feet Mean Sea Level, POC : Point of Compliance

Table VI.B.2.b. - Historical Monitor Well Water Levels

Alon USA Big Spring Refinery [CP-50140]

		Data	FLUID LEVEL MEASUREMENT EVENTS									STATISTICS		
			Jan-20	Jul-20	Jan-21	Jul-21	Jan-22	Jul-22	Jan-23	Jul-23	Jan-24	Maximum	Minimum	Average
Well >	**MW-154**	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**	**0.00**
Program>	**BICA**	Groundwater Level (ft-bTOC)	66.47	66.63	66.71	65.62	65.86	66.12	66.16	65.93	65.93	**67.97**	**65.62**	**66.52**
Type >	**POC**	Groundwater Level (ft-MSL)	2385.09	2384.93	2384.85	2385.94	2385.70	2385.44	2385.40	2385.63	2385.63	**2385.94**	**2380.94**	**2384.78**
		Corrected Groundwater Level (ft-MSL)	2385.09	2384.93	2384.85	2385.94	2385.70	2385.44	2385.40	2385.63	2385.63	**2385.94**	**2380.94**	**2384.78**
Well >	**MW-154A**	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**	**0.00**
Program>	**BICA**	Groundwater Level (ft-bTOC)	66.49	66.67	66.70	65.60	65.87	66.12	66.17	65.94	65.92	**68.00**	**60.96**	**66.24**
Type >	**POC**	Groundwater Level (ft-MSL)	2385.09	2384.91	2384.88	2385.98	2385.71	2385.46	2385.41	2385.64	2385.66	**2390.62**	**2380.90**	**2385.08**
		Corrected Groundwater Level (ft-MSL)	2385.09	2384.91	2384.88	2385.98	2385.71	2385.46	2385.41	2385.64	2385.66	**2390.62**	**2380.90**	**2385.08**
Well >	**MW-155**	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**	**0.00**
Program>	**BICA**	Groundwater Level (ft-bTOC)	76.61	76.48	76.17	76.10	75.78	75.65	75.61	75.76	76.01	**76.70**	**75.42**	**76.00**
Type >	**POC**	Groundwater Level (ft-MSL)	2379.04	2379.17	2379.48	2379.55	2379.87	2380.00	2380.04	2379.89	2379.64	**2380.04**	**2377.10**	**2379.37**
		Corrected Groundwater Level (ft-MSL)	2379.04	2379.17	2379.48	2379.55	2379.87	2380.00	2380.04	2379.89	2379.64	**2380.04**	**2377.10**	**2379.37**
Well >	**MW-155A**	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**	**0.00**
Program>	**BICA**	Groundwater Level (ft-bTOC)	76.01	75.91	75.65	75.53	75.20	75.07	74.99	75.22	75.41	**76.12**	**74.89**	**75.44**
Type >	**POC**	Groundwater Level (ft-MSL)	2379.10	2379.20	2379.46	2379.58	2379.91	2380.04	2380.12	2379.89	2379.70	**2380.12**	**2377.09**	**2379.39**
		Corrected Groundwater Level (ft-MSL)	2379.10	2379.20	2379.46	2379.58	2379.91	2380.04	2380.12	2379.89	2379.70	**2380.12**	**2377.09**	**2379.39**
Well >	**MW-163**	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**	**0.00**
Program>	**BICA**	Groundwater Level (ft-bTOC)	18.38	18.68	18.62	17.50	17.94	18.59	18.17	18.40	16.68	**20.03**	**16.68**	**18.51**
Type >	**POC**	Groundwater Level (ft-MSL)	2381.52	2381.22	2381.28	2382.40	2381.96	2381.31	2381.73	2381.50	2383.22	**2383.22**	**2374.42**	**2380.87**
		Corrected Groundwater Level (ft-MSL)	2381.52	2381.22	2381.28	2382.40	2381.96	2381.31	2381.73	2381.50	2383.22	**2383.22**	**2374.42**	**2380.87**
Well >	**MW-163A**	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**	**0.00**
Program>	**BICA**	Groundwater Level (ft-bTOC)	19.01	19.30	19.30	18.18	18.59	19.23	18.82	19.04	18.51	**20.63**	**18.18**	**19.20**
Type >	**POC**	Groundwater Level (ft-MSL)	2381.55	2381.26	2381.26	2382.38	2381.97	2381.33	2381.74	2381.52	2382.05	**2382.38**	**2376.96**	**2381.08**
		Corrected Groundwater Level (ft-MSL)	2381.55	2381.26	2381.26	2382.38	2381.97	2381.33	2381.74	2381.52	2382.05	**2382.38**	**2376.96**	**2381.08**
Well >	**MW-165R**	LNAPL Thickness (feet)	P&A'd - Replaced			0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**	**0.00**
Program>	**BICA**	Groundwater Level (ft-bTOC)	P&A'd - Replaced			74.92	75.04	75.26	75.09	75.40	75.49	**77.59**	**74.92**	**76.21**
Type >	**POC**	Groundwater Level (ft-MSL)	P&A'd - Replaced			2378.46	2378.34	2378.12	2378.29	2377.98	2377.89	**2378.46**	**2373.87**	**2376.78**
		Corrected Groundwater Level (ft-MSL)	P&A'd - Replaced			2378.46	2378.34	2378.12	2378.29	2377.98	2377.89	**2378.46**	**2373.87**	**2376.78**
Well >	**MW-165AR**	LNAPL Thickness (feet)	P&A'd - Replaced			0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**	**0.00**
Program>	**BICA**	Groundwater Level (ft-bTOC)	P&A'd - Replaced			74.90	74.93	75.19	74.99	75.32	75.39	**77.41**	**74.90**	**76.04**
Type >	**POC**	Groundwater Level (ft-MSL)	P&A'd - Replaced			2378.56	2378.53	2378.27	2378.47	2378.14	2378.07	**2378.56**	**2373.83**	**2376.78**
		Corrected Groundwater Level (ft-MSL)	P&A'd - Replaced			2378.56	2378.53	2378.27	2378.47	2378.14	2378.07	**2378.56**	**2373.83**	**2376.78**
Well >	**MW-166**	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**	**0.00**
Program>	**BICA**	Groundwater Level (ft-bTOC)	74.61	74.54	74.52	73.22	74.06	74.16	74.21	74.47	74.59	**75.21**	**72.80**	**74.26**
Type >	**POC**	Groundwater Level (ft-MSL)	2367.59	2367.66	2367.68	2368.98	2368.14	2368.04	2367.99	2367.73	2367.61	**2369.03**	**2365.38**	**2367.66**
		Corrected Groundwater Level (ft-MSL)	2367.59	2367.66	2367.68	2368.98	2368.14	2368.04	2367.99	2367.73	2367.61	**2369.03**	**2365.38**	**2367.66**
Well >	**MW-166A**	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**	**0.00**
Program>	**BICA**	Groundwater Level (ft-bTOC)	74.77	74.68	74.64	73.43	74.21	74.32	74.35	74.61	74.73	**75.40**	**72.91**	**74.40**
Type >	**POC**	Groundwater Level (ft-MSL)	2367.44	2367.53	2367.57	2368.78	2368.00	2367.89	2367.86	2367.60	2367.48	**2368.91**	**2365.45**	**2367.53**
		Corrected Groundwater Level (ft-MSL)	2367.44	2367.53	2367.57	2368.78	2368.00	2367.89	2367.86	2367.60	2367.48	**2368.91**	**2365.45**	**2367.53**

ft-TOC : Feet Below Top of Casing, ft-MSL : Feet Mean Sea Level, POC : Point of Compliance

Table VI.B.2.b. - Historical Monitor Well Water Levels

Alon USA Big Spring Refinery [CP-50140]

		Data	FLUID LEVEL MEASUREMENT EVENTS											
			Jan-14	Jul-14	Mar-15	Jul-15	Jan-16	Jul-16	Jan-17	Jul-17	Jan-18	Jul-18	Jan-19	Jul-19
Well >	RW-173	LNAPL Thickness (feet)	4.30	3.13	3.48	3.27	1.81	0.00	0.15	3.56	4.19	4.80	4.90	3.23
Program>	BICA	Groundwater Level (ft-bTOC)	74.37	72.41	71.43	70.94	69.30	66.64	67.82	71.24	72.47	73.62	73.80	70.88
Type >	Recovery	Groundwater Level (ft-MSL)	2380.90	2382.86	2384.83	2385.32	2386.96	2389.62	2388.44	2385.02	2383.79	2382.64	2382.46	2385.38
		Corrected Groundwater Level (ft-MSL)	2384.25	2385.30	2387.51	2387.84	2388.35	2389.62	2388.56	2387.80	2387.06	2386.38	2386.28	2387.90
Well >	RW-174	LNAPL Thickness (feet)	5.52	0.11	3.66	3.57	0.00	0.00	0.00	0.00	2.17	4.46	4.52	3.66
Program>	BICA	Groundwater Level (ft-bTOC)	73.33	68.86	70.07	69.51	66.14	64.81	66.20	66.91	69.40	71.92	72.05	69.55
Type >	Recovery	Groundwater Level (ft-MSL)	2380.13	2384.60	2384.42	2384.98	2388.35	2389.68	2388.29	2387.58	2385.09	2382.57	2382.44	2384.94
		Corrected Groundwater Level (ft-MSL)	2384.44	2384.69	2387.35	2387.84	2388.35	2389.68	2388.29	2387.58	2386.78	2386.05	2385.97	2387.79
Well >	RW-175	LNAPL Thickness (feet)	7.16	0.18	4.31	4.16	2.98	0.00	4.53	0.08	5.54	5.88	5.88	5.42
Program>	BICA	Groundwater Level (ft-bTOC)	55.23	49.08	50.89	50.53	48.58	45.55	50.63	47.44	52.87	53.61	53.96	51.79
Type >	Recovery	Groundwater Level (ft-MSL)	2378.55	2385.82	2384.01	2384.37	2386.32	2389.35	2384.27	2387.46	2382.03	2381.29	2380.94	2383.11
		Corrected Groundwater Level (ft-MSL)	2384.13	2385.96	2387.41	2387.66	2388.67	2389.35	2387.85	2387.52	2386.46	2385.99	2385.64	2387.45
Well >	RW-177	LNAPL Thickness (feet)	0.00	1.10	0.04	0.00	0.00	0.00	0.00	0.47	2.78	3.68	2.42	0.93
Program>	BICA	Groundwater Level (ft-bTOC)	48.59	50.51	46.24	46.58	44.90	43.77	47.28	48.29	51.48	53.00	50.74	46.54
Type >	Recovery	Groundwater Level (ft-MSL)	2384.51	2382.59	2388.17	2387.83	2389.51	2390.64	2387.13	2386.12	2382.93	2381.41	2383.67	2387.87
		Corrected Groundwater Level (ft-MSL)	2384.51	2383.45	2388.20	2387.83	2389.51	2390.64	2387.13	2386.51	2385.10	2384.28	2385.56	2388.60
Well >	RW-178	LNAPL Thickness (feet)	5.88	dry	0.28	0.01	1.17	0.01	0.94	0.35	1.47	0.54	0.10	2.46
Program>	BICA	Groundwater Level (ft-bTOC)	56.00	dry	49.65	49.68	50.55	48.39	50.03	50.19	51.73	51.49	51.12	51.85
Type >	Recovery	Groundwater Level (ft-MSL)	2380.18	dry	2388.00	2387.97	2387.10	2389.26	2387.62	2387.46	2385.92	2386.16	2386.53	2385.80
		Corrected Groundwater Level (ft-MSL)	2385.18	dry	2388.24	2387.98	2388.09	2389.27	2388.42	2387.76	2387.17	2386.62	2386.62	2387.89
Well >	RW-179	LNAPL Thickness (feet)	6.55	dry	4.73	4.71	0.33	0.01	3.52	0.01	0.96	4.29	4.65	0.42
Program>	BICA	Groundwater Level (ft-bTOC)	54.55	dry	51.58	51.10	47.40	45.79	49.80	47.74	49.46	52.81	53.17	48.02
Type >	Recovery	Groundwater Level (ft-MSL)	2378.95	dry	2383.17	2383.65	2387.35	2388.96	2384.95	2387.01	2385.29	2381.94	2381.58	2386.73
		Corrected Groundwater Level (ft-MSL)	2384.52	dry	2387.00	2387.47	2387.62	2388.97	2387.80	2387.02	2386.06	2385.37	2385.30	2387.07
Well >	RW-185	LNAPL Thickness (feet)	6.93	8.85	5.80	5.34	4.81	3.21	3.22	3.42	0.00	6.85	7.07	5.78
Program>	BICA	Groundwater Level (ft-bTOC)	72.97	74.46	70.79	70.05	68.91	66.67	67.18	68.09	64.75	72.19	72.62	70.37
Type >	Recovery	Groundwater Level (ft-MSL)	2380.27	2378.78	2383.39	2384.13	2385.27	2387.51	2387.00	2386.09	2389.43	2381.99	2381.56	2383.81
		Corrected Groundwater Level (ft-MSL)	2385.81	2385.86	2388.03	2388.40	2389.12	2390.08	2389.58	2388.83	2389.43	2387.88	2387.64	2388.78
Well >	RW-192	LNAPL Thickness (feet)	0.00	7.72	7.17	6.87	6.68	0.01	0.00	0.17	3.73	3.92	3.18	2.51
Program>	BICA	Groundwater Level (ft-bTOC)	73.95	81.61	80.74	80.34	74.67	73.76	74.50	74.89	78.32	78.92	78.30	76.71
Type >	Recovery	Groundwater Level (ft-MSL)	2385.99	2378.33	2380.31	2380.71	2386.38	2387.29	2386.55	2386.16	2382.73	2382.13	2382.75	2384.34
		Corrected Groundwater Level (ft-MSL)	2385.99	2384.81	2386.33	2386.48	2386.38	2387.30	2386.55	2386.30	2385.86	2385.42	2385.42	2386.45
Well >	RW-194	LNAPL Thickness (feet)	nm	nm	nm	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Program>	BICA	Groundwater Level (ft-bTOC)	nm	nm	nm	65.05	65.18	68.57	68.78	68.87	66.26	70.72	67.74	69.22
Type >	Recovery	Groundwater Level (ft-MSL)	nm	nm	nm	2376.81	2376.68	2373.29	2373.08	2372.99	2375.60	2371.14	2374.12	2372.64
		Corrected Groundwater Level (ft-MSL)	nm	nm	nm	2376.81	2376.68	2373.29	2373.08	2372.99	2375.60	2371.14	2374.12	2372.64
Well >	RW-195	LNAPL Thickness (feet)	nm	nm	nm	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Program>	BICA	Groundwater Level (ft-bTOC)	nm	nm	nm	61.43	61.59	61.26	71.66	71.03	63.45	57.14	57.23	58.34
Type >	Recovery	Groundwater Level (ft-MSL)	nm	nm	nm	2372.98	2372.82	2373.15	2362.75	2363.38	2370.96	2377.27	2377.18	2376.07
		Corrected Groundwater Level (ft-MSL)	nm	nm	nm	2372.98	2372.82	2373.15	2362.75	2363.38	2370.96	2377.27	2377.18	2376.07

ft-TOC : Feet Below Top of Casing, ft-MSL : Feet Mean Sea Level, POC : Point of Compliance

Table VI.B.2.b. - Historical Monitor Well Water Levels

Alon USA Big Spring Refinery [CP-50140]

		Data	FLUID LEVEL MEASUREMENT EVENTS									STATISTICS		
			Jan-20	Jul-20	Jan-21	Jul-21	Jan-22	Jul-22	Jan-23	Jul-23	Jan-24	Maximum	Minimum	Average
Well >	RW-173	LNAPL Thickness (feet)	3.65	3.05	0.23	2.69	0.02	0.51	0.49	0.60	1.55	**4.90**	**0.00**	**2.36**
Program>	BICA	Groundwater Level (ft-bTOC)	71.70	70.25	67.38	68.98	66.07	66.68	66.45	66.67	68.64	**74.37**	**66.07**	**69.89**
Type >	Recovery	Groundwater Level (ft-MSL)	2384.56	2386.01	2388.88	2387.28	2390.19	2389.58	2389.81	2389.59	2387.62	**2390.19**	**2380.90**	**2386.27**
		Corrected Groundwater Level (ft-MSL)	2387.41	2388.39	2389.06	2389.38	2390.21	2389.98	2390.19	2390.06	2388.88	**2390.21**	**2384.25**	**2388.11**
Well >	RW-174	LNAPL Thickness (feet)	3.60	3.64	3.57	3.52	3.36	0.00	0.00	0.00	0.00	**5.52**	**0.00**	**2.16**
Program>	BICA	Groundwater Level (ft-bTOC)	70.15	69.02	69.25	67.70	67.62	64.48	64.34	64.57	65.50	**73.33**	**64.34**	**68.16**
Type >	Recovery	Groundwater Level (ft-MSL)	2384.34	2385.47	2385.24	2386.79	2386.87	2390.01	2390.15	2389.92	2388.99	**2390.15**	**2380.13**	**2386.23**
		Corrected Groundwater Level (ft-MSL)	2387.15	2388.31	2388.02	2389.54	2389.49	2390.01	2390.15	2389.92	2388.99	**2390.15**	**2384.44**	**2387.92**
Well >	RW-175	LNAPL Thickness (feet)	5.07	4.15	4.37	3.88	3.90	1.21	1.20	1.15	1.55	**7.16**	**0.00**	**3.46**
Program>	BICA	Groundwater Level (ft-bTOC)	51.93	49.95	50.65	48.38	48.60	45.76	45.95	45.80	47.40	**55.23**	**45.55**	**49.74**
Type >	Recovery	Groundwater Level (ft-MSL)	2382.97	2384.95	2384.25	2386.52	2386.30	2389.14	2388.95	2389.10	2387.50	**2389.35**	**2378.55**	**2385.10**
		Corrected Groundwater Level (ft-MSL)	2387.03	2388.27	2387.75	2389.62	2389.42	2390.11	2389.91	2390.02	2388.77	**2390.11**	**2384.13**	**2387.86**
Well >	RW-177	LNAPL Thickness (feet)	1.63	1.45	1.35	1.32	1.25	1.20	1.13	1.11	1.06	**3.68**	**0.00**	**1.09**
Program>	BICA	Groundwater Level (ft-bTOC)	49.08	47.45	47.83	44.55	46.58	45.92	45.02	45.94	47.57	**53.00**	**43.77**	**47.52**
Type >	Recovery	Groundwater Level (ft-MSL)	2385.33	2386.96	2386.58	2389.86	2387.83	2388.49	2389.39	2388.47	2386.84	**2390.64**	**2381.41**	**2386.77**
		Corrected Groundwater Level (ft-MSL)	2386.60	2388.09	2387.63	2390.89	2388.81	2389.43	2390.27	2389.34	2387.70	**2390.89**	**2383.45**	**2387.62**
Well >	RW-178	LNAPL Thickness (feet)	1.28	0.05	0.57	0.01	0.38	0.02	0.08	0.12	0.26	**5.88**	**0.01**	**0.80**
Program>	BICA	Groundwater Level (ft-bTOC)	51.48	49.51	49.65	48.49	48.28	47.77	47.72	47.82	48.54	**56.00**	**47.72**	**50.00**
Type >	Recovery	Groundwater Level (ft-MSL)	2386.17	2388.14	2388.00	2389.16	2389.37	2389.88	2389.93	2389.83	2389.11	**2389.93**	**2380.18**	**2387.58**
		Corrected Groundwater Level (ft-MSL)	2387.26	2388.18	2388.48	2389.17	2389.69	2389.90	2390.00	2389.93	2389.33	**2390.00**	**2385.18**	**2388.26**
Well >	RW-179	LNAPL Thickness (feet)	0.35	0.32	0.02	3.23	3.06	3.66	3.48	3.44	3.50	**6.55**	**0.01**	**2.56**
Program>	BICA	Groundwater Level (ft-bTOC)	48.53	47.25	47.26	47.74	48.08	47.90	47.92	47.72	48.68	**54.55**	**45.79**	**49.13**
Type >	Recovery	Groundwater Level (ft-MSL)	2386.22	2387.50	2387.49	2387.01	2386.67	2386.85	2386.83	2387.03	2386.07	**2388.96**	**2378.95**	**2385.56**
		Corrected Groundwater Level (ft-MSL)	2386.50	2387.76	2387.51	2389.59	2389.12	2389.78	2389.61	2389.78	2388.87	**2389.78**	**2384.52**	**2387.64**
Well >	RW-185	LNAPL Thickness (feet)	6.06	5.13	5.26	5.16	4.92	4.91	4.81	4.81	4.75	**8.85**	**0.00**	**5.10**
Program>	BICA	Groundwater Level (ft-bTOC)	70.94	69.17	69.47	68.27	68.06	67.33	67.15	67.64	67.88	**74.46**	**64.75**	**69.28**
Type >	Recovery	Groundwater Level (ft-MSL)	2383.24	2385.01	2384.71	2385.91	2386.12	2386.85	2387.03	2386.54	2386.30	**2389.43**	**2378.78**	**2384.81**
		Corrected Groundwater Level (ft-MSL)	2388.45	2389.42	2389.23	2390.35	2390.35	2391.07	2391.17	2390.68	2390.10	**2391.17**	**2385.81**	**2389.06**
Well >	RW-192	LNAPL Thickness (feet)	2.42	2.46	2.39	2.42	1.98	2.39	2.30	2.30	2.25	**7.72**	**0.00**	**2.99**
Program>	BICA	Groundwater Level (ft-bTOC)	76.92	76.46	76.51	75.27	74.10	74.60	74.55	74.45	74.80	**81.61**	**73.76**	**76.40**
Type >	Recovery	Groundwater Level (ft-MSL)	2384.13	2384.59	2384.54	2385.78	2386.95	2386.45	2386.50	2386.60	2386.25	**2387.29**	**2378.33**	**2384.55**
		Corrected Groundwater Level (ft-MSL)	2386.16	2386.66	2386.55	2387.81	2388.61	2388.46	2388.43	2388.53	2388.14	**2388.61**	**2384.81**	**2386.79**
Well >	RW-194	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**	**0.00**
Program>	BICA	Groundwater Level (ft-bTOC)	69.01	64.73	64.48	63.57	62.76	>67.35	>67.35	>67.35	>67.35	**70.72**	**62.76**	**66.78**
Type >	Recovery	Groundwater Level (ft-MSL)	2372.85	2377.13	2377.38	2378.29	2379.10	na	na	na	na	**2379.10**	**2371.14**	**2375.08**
		Corrected Groundwater Level (ft-MSL)	2372.85	2377.13	2377.38	2378.29	2379.10	na	na	na	na	**2379.10**	**2371.14**	**2375.08**
Well >	RW-195	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**	**0.00**
Program>	BICA	Groundwater Level (ft-bTOC)	62.39	61.16	60.50	59.28	58.62	56.86	58.66	59.22	58.97	**71.66**	**56.86**	**61.04**
Type >	Recovery	Groundwater Level (ft-MSL)	2372.02	2373.25	2373.91	2375.13	2375.79	2377.55	2375.75	2375.19	2375.44	**2377.55**	**2362.75**	**2373.37**
		Corrected Groundwater Level (ft-MSL)	2372.02	2373.25	2373.91	2375.13	2375.79	2377.55	2375.75	2375.19	2375.44	**2377.55**	**2362.75**	**2373.37**

ft-TOC : Feet Below Top of Casing, ft-MSL : Feet Mean Sea Level, POC : Point of Compliance

Table VI.B.2.b. - Historical Monitor Well Water Levels

Alon USA Big Spring Refinery [CP-50140]

		Data	FLUID LEVEL MEASUREMENT EVENTS											
			Jan-14	Jul-14	Mar-15	Jul-15	Jan-16	Jul-16	Jan-17	Jul-17	Jan-18	Jul-18	Jan-19	Jul-19
Well >	MW-214	LNAPL Thickness (feet)	0.00	nm	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Program>	BICA	Groundwater Level (ft-bTOC)	86.20	nm	86.32	86.75	86.55	86.56	86.41	86.77	86.49	87.19	86.80	86.92
Type >	POC	Groundwater Level (ft-MSL)	2388.25	nm	2391.14	2390.71	2390.91	2390.90	2391.05	2390.69	2390.97	2390.27	2390.66	2390.54
		Corrected Groundwater Level (ft-MSL)	2388.25	nm	2391.14	2390.71	2390.91	2390.90	2391.05	2390.69	2390.97	2390.27	2390.66	2390.54
Well >	MW-214A	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Program>	BICA	Groundwater Level (ft-bTOC)	85.73	86.39	85.92	86.30	86.18	86.13	86.04	86.31	86.08	86.65	86.40	86.39
Type >	POC	Groundwater Level (ft-MSL)	2388.85	2388.19	2391.67	2391.29	2391.41	2391.46	2391.55	2391.28	2391.51	2390.94	2391.19	2391.20
		Corrected Groundwater Level (ft-MSL)	2388.85	2388.19	2391.67	2391.29	2391.41	2391.46	2391.55	2391.28	2391.51	2390.94	2391.19	2391.20
Well >	MW-215	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Program>	BICA	Groundwater Level (ft-bTOC)	97.40	97.71	88.71	97.78	97.99	98.01	98.15	98.23	98.33	98.56	98.74	98.71
Type >	POC	Groundwater Level (ft-MSL)	2382.79	2382.48	2394.46	2385.39	2385.18	2385.16	2385.02	2384.94	2384.84	2384.61	2384.43	2384.46
		Corrected Groundwater Level (ft-MSL)	2382.79	2382.48	2394.46	2385.39	2385.18	2385.16	2385.02	2384.94	2384.84	2384.61	2384.43	2384.46
Well >	MW-215A	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Program>	BICA	Groundwater Level (ft-bTOC)	96.60	96.98	96.95	97.05	97.24	97.27	97.46	97.53	97.57	97.83	97.98	97.95
Type >	POC	Groundwater Level (ft-MSL)	2383.84	2383.46	2386.47	2386.37	2386.18	2386.15	2385.96	2385.89	2385.85	2385.59	2385.44	2385.47
		Corrected Groundwater Level (ft-MSL)	2383.84	2383.46	2386.47	2386.37	2386.18	2386.15	2385.96	2385.89	2385.85	2385.59	2385.44	2385.47
Well >	MW-218	LNAPL Thickness (feet)	dry	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Program>	BICA	Groundwater Level (ft-bTOC)	dry	84.00	84.12	84.18	84.24	84.21	84.19	84.30	84.44	84.70	84.94	83.64
Type >	POC	Groundwater Level (ft-MSL)	dry	2380.82	2384.02	2383.96	2383.90	2383.93	2383.95	2383.54	2383.40	2383.14	2382.90	2384.20
		Corrected Groundwater Level (ft-MSL)	dry	2380.82	2384.02	2383.96	2383.90	2383.93	2383.95	2383.54	2383.40	2383.14	2382.90	2384.20
Well >	MW-218A	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Program>	BICA	Groundwater Level (ft-bTOC)	83.90	83.99	84.15	84.22	84.25	84.20	84.20	84.33	84.46	84.75	85.00	84.83
Type >	POC	Groundwater Level (ft-MSL)	2380.94	2380.85	2383.69	2383.62	2383.59	2383.64	2383.64	2383.81	2383.68	2383.39	2383.14	2383.31
		Corrected Groundwater Level (ft-MSL)	2380.94	2380.85	2383.69	2383.62	2383.59	2383.64	2383.64	2383.81	2383.68	2383.39	2383.14	2383.31
Well >	MW-220	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Program>	BICA	Groundwater Level (ft-bTOC)	95.10	95.06	95.52	96.94	96.96	96.57	96.80	96.84	96.71	97.24	96.96	97.81
Type >	POC	Groundwater Level (ft-MSL)	2397.43	2397.47	2397.01	2395.59	2395.57	2395.96	2395.73	2395.69	2395.82	2395.29	2395.57	2394.72
		Corrected Groundwater Level (ft-MSL)	2397.43	2397.47	2397.01	2395.59	2395.57	2395.96	2395.73	2395.69	2395.82	2395.29	2395.57	2394.72
Well >	MW-220A	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Program>	BICA	Groundwater Level (ft-bTOC)	97.54	77.93	97.80	97.86	97.84	97.64	97.64	97.69	97.56	98.02	97.84	97.70
Type >	POC	Groundwater Level (ft-MSL)	2392.51	2412.12	2395.15	2395.09	2395.11	2395.31	2395.31	2395.26	2395.39	2394.93	2395.11	2395.25
		Corrected Groundwater Level (ft-MSL)	2392.51	2412.12	2395.15	2395.09	2395.11	2395.31	2395.31	2395.26	2395.39	2394.93	2395.11	2395.25
Well >	MW-221	LNAPL Thickness (feet)	0.01	nm	2.60	2.50	1.91	1.22	0.87	0.26	0.03	0.65	0.01	0.01
Program>	BICA	Groundwater Level (ft-bTOC)	112.30	nm	114.68	114.51	113.87	113.06	112.68	112.03	111.74	112.55	111.84	111.63
Type >	POC	Groundwater Level (ft-MSL)	2397.19	nm	2398.00	2398.17	2398.81	2399.62	2400.00	2400.65	2400.94	2400.13	2400.84	2401.05
		Corrected Groundwater Level (ft-MSL)	2397.20	nm	2400.03	2400.12	2400.30	2400.57	2400.68	2400.85	2400.96	2400.64	2400.85	2401.06
Well >	MW-221A	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Program>	BICA	Groundwater Level (ft-bTOC)	112.30	112.41	112.05	111.95	111.76	111.45	111.35	111.45	111.02	111.34	111.15	110.90
Type >	POC	Groundwater Level (ft-MSL)	2397.13	2397.02	2400.51	2400.61	2400.80	2401.11	2401.21	2401.11	2401.54	2401.22	2401.41	2401.66
		Corrected Groundwater Level (ft-MSL)	2397.13	2397.02	2400.51	2400.61	2400.80	2401.11	2401.21	2401.11	2401.54	2401.22	2401.41	2401.66

ft-TOC : Feet Below Top of Casing, ft-MSL : Feet Mean Sea Level, POC : Point of Compliance

Table VI.B.2.b. - Historical Monitor Well Water Levels

Alon USA Big Spring Refinery [CP-50140]

		Data	FLUID LEVEL MEASUREMENT EVENTS									STATISTICS		
			Jan-20	Jul-20	Jan-21	Jul-21	Jan-22	Jul-22	Jan-23	Jul-23	Jan-24	Maximum	Minimum	Average
Well >	**MW-214**	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**	**0.00**
Program>	**BICA**	Groundwater Level (ft-bTOC)	86.89	87.18	86.94	86.61	86.49	86.54	86.34	86.63	86.57	**87.19**	**86.20**	**86.66**
Type >	**POC**	Groundwater Level (ft-MSL)	2390.57	2390.28	2390.52	2390.85	2390.97	2390.92	2391.12	2390.83	2390.89	**2391.14**	**2388.25**	**2390.65**
		Corrected Groundwater Level (ft-MSL)	2390.57	2390.28	2390.52	2390.85	2390.97	2390.92	2391.12	2390.83	2390.89	**2391.14**	**2388.25**	**2390.65**
Well >	**MW-214A**	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**	**0.00**
Program>	**BICA**	Groundwater Level (ft-bTOC)	86.46	86.65	86.47	86.15	86.08	86.15	85.90	86.13	86.14	**86.65**	**85.73**	**86.22**
Type >	**POC**	Groundwater Level (ft-MSL)	2391.13	2390.94	2391.12	2391.44	2391.51	2391.44	2391.69	2391.46	2391.45	**2391.69**	**2388.19**	**2391.08**
		Corrected Groundwater Level (ft-MSL)	2391.13	2390.94	2391.12	2391.44	2391.51	2391.44	2391.69	2391.46	2391.45	**2391.69**	**2388.19**	**2391.08**
Well >	**MW-215**	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**	**0.00**
Program>	**BICA**	Groundwater Level (ft-bTOC)	98.83	99.00	99.07	98.68	98.61	98.55	98.63	98.55	98.83	**99.07**	**88.71**	**97.96**
Type >	**POC**	Groundwater Level (ft-MSL)	2384.34	2384.17	2384.10	2384.49	2384.56	2384.62	2384.54	2384.62	2384.34	**2394.46**	**2382.48**	**2384.93**
		Corrected Groundwater Level (ft-MSL)	2384.34	2384.17	2384.10	2384.49	2384.56	2384.62	2384.54	2384.62	2384.34	**2394.46**	**2382.48**	**2384.93**
Well >	**MW-215A**	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**	**0.00**
Program>	**BICA**	Groundwater Level (ft-bTOC)	98.06	98.28	98.38	97.98	97.97	97.88	97.95	97.89	98.18	**98.38**	**96.60**	**97.67**
Type >	**POC**	Groundwater Level (ft-MSL)	2385.36	2385.14	2385.04	2385.44	2385.45	2385.54	2385.47	2385.53	2385.24	**2386.47**	**2383.46**	**2385.47**
		Corrected Groundwater Level (ft-MSL)	2385.36	2385.14	2385.04	2385.44	2385.45	2385.54	2385.47	2385.53	2385.24	**2386.47**	**2383.46**	**2385.47**
Well >	**MW-218**	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**	**0.00**
Program>	**BICA**	Groundwater Level (ft-bTOC)	84.91	84.71	84.83	84.24	83.99	84.04	83.99	83.93	84.35	**84.94**	**83.64**	**84.30**
Type >	**POC**	Groundwater Level (ft-MSL)	2382.93	2383.13	2383.01	2383.60	2383.85	2383.80	2383.85	2383.91	2383.49	**2384.20**	**2380.82**	**2383.47**
		Corrected Groundwater Level (ft-MSL)	2382.93	2383.13	2383.01	2383.60	2383.85	2383.80	2383.85	2383.91	2383.49	**2384.20**	**2380.82**	**2383.47**
Well >	**MW-218A**	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**	**0.00**
Program>	**BICA**	Groundwater Level (ft-bTOC)	84.99	84.84	84.46	84.45	84.04	84.11	84.04	84.07	84.39	**85.00**	**83.90**	**84.37**
Type >	**POC**	Groundwater Level (ft-MSL)	2383.15	2383.30	2383.68	2383.69	2384.10	2384.03	2384.10	2384.07	2383.75	**2384.10**	**2380.85**	**2383.39**
		Corrected Groundwater Level (ft-MSL)	2383.15	2383.30	2383.68	2383.69	2384.10	2384.03	2384.10	2384.07	2383.75	**2384.10**	**2380.85**	**2383.39**
Well >	**MW-220**	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**	**0.00**
Program>	**BICA**	Groundwater Level (ft-bTOC)	96.94	96.70	96.51	96.19	96.33	96.38	96.04	96.06	96.39	**97.81**	**95.06**	**96.48**
Type >	**POC**	Groundwater Level (ft-MSL)	2395.59	2395.83	2396.02	2396.34	2396.20	2396.15	2396.49	2396.47	2396.14	**2397.47**	**2394.72**	**2396.05**
		Corrected Groundwater Level (ft-MSL)	2395.59	2395.83	2396.02	2396.34	2396.20	2396.15	2396.49	2396.47	2396.14	**2397.47**	**2394.72**	**2396.05**
Well >	**MW-220A**	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**	**0.00**
Program>	**BICA**	Groundwater Level (ft-bTOC)	97.77	97.59	97.38	97.16	97.23	97.26	96.96	96.99	97.23	**98.02**	**77.93**	**96.60**
Type >	**POC**	Groundwater Level (ft-MSL)	2395.18	2395.36	2395.57	2395.79	2395.72	2395.69	2395.99	2395.96	2395.72	**2412.12**	**2392.51**	**2396.07**
		Corrected Groundwater Level (ft-MSL)	2395.18	2395.36	2395.57	2395.79	2395.72	2395.69	2395.99	2395.96	2395.72	**2412.12**	**2392.51**	**2396.07**
Well >	**MW-221**	LNAPL Thickness (feet)	0.01	0.01	0.01	0.01	0.02	0.01	0.03	0.02	0.03	**2.60**	**0.01**	**0.51**
Program>	**BICA**	Groundwater Level (ft-bTOC)	111.68	111.48	111.16	111.26	111.12	111.14	111.12	110.93	111.44	**114.68**	**110.93**	**112.11**
Type >	**POC**	Groundwater Level (ft-MSL)	2401.00	2401.20	2401.52	2401.42	2401.56	2401.54	2401.56	2401.75	2401.24	**2401.75**	**2397.19**	**2400.41**
		Corrected Groundwater Level (ft-MSL)	2401.01	2401.21	2401.53	2401.43	2401.58	2401.55	2401.58	2401.77	2401.26	**2401.77**	**2397.20**	**2400.81**
Well >	**MW-221A**	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**	**0.00**
Program>	**BICA**	Groundwater Level (ft-bTOC)	110.96	110.82	110.49	110.62	110.45	110.45	110.46	110.32	110.79	**112.41**	**110.32**	**111.17**
Type >	**POC**	Groundwater Level (ft-MSL)	2401.60	2401.74	2402.07	2401.94	2402.11	2402.11	2402.10	2402.24	2401.77	**2402.24**	**2397.02**	**2401.10**
		Corrected Groundwater Level (ft-MSL)	2401.60	2401.74	2402.07	2401.94	2402.11	2402.11	2402.10	2402.24	2401.77	**2402.24**	**2397.02**	**2401.10**

ft-TOC : Feet Below Top of Casing, ft-MSL : Feet Mean Sea Level, POC : Point of Compliance

Table VI.B.2.b. - Historical Monitor Well Water Levels

Alon USA Big Spring Refinery [CP-50140]

		Data	FLUID LEVEL MEASUREMENT EVENTS											
			Jan-14	Jul-14	Mar-15	Jul-15	Jan-16	Jul-16	Jan-17	Jul-17	Jan-18	Jul-18	Jan-19	Jul-19
Well >	MW-223	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Program>	BICA	Groundwater Level (ft-bTOC)	104.49	104.69	104.63	104.37	104.43	103.73	104.13	104.00	104.04	104.51	104.12	103.46
Type >	POC	Groundwater Level (ft-MSL)	2397.68	2397.48	2400.67	2400.93	2400.87	2401.57	2401.17	2401.30	2401.26	2400.79	2401.18	2401.84
		Corrected Groundwater Level (ft-MSL)	2397.68	2397.48	2400.67	2400.93	2400.87	2401.57	2401.17	2401.30	2401.26	2400.79	2401.18	2401.84
Well >	MW-223A	LNAPL Thickness (feet)	0.00	nm	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Program>	BICA	Groundwater Level (ft-bTOC)	105.60	nm	105.78	105.51	105.56	104.97	105.27	105.16	105.28	105.64	105.23	104.65
Type >	POC	Groundwater Level (ft-MSL)	2397.91	nm	2400.68	2400.95	2400.90	2401.49	2401.19	2401.30	2401.18	2400.82	2401.23	2401.81
		Corrected Groundwater Level (ft-MSL)	2397.91	nm	2400.68	2400.95	2400.90	2401.49	2401.19	2401.30	2401.18	2400.82	2401.23	2401.81
Well >	MW-224	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Program>	BICA	Groundwater Level (ft-bTOC)	119.35	119.47	119.41	119.36	119.29	118.99	118.99	118.85	118.77	119.07	118.90	118.56
Type >	POC	Groundwater Level (ft-MSL)	2399.45	2399.33	2402.51	2402.56	2402.63	2402.93	2402.93	2403.07	2403.15	2402.85	2403.02	2403.36
		Corrected Groundwater Level (ft-MSL)	2399.45	2399.33	2402.51	2402.56	2402.63	2402.93	2402.93	2403.07	2403.15	2402.85	2403.02	2403.36
Well >	MW-224A	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Program>	BICA	Groundwater Level (ft-bTOC)	118.99	119.11	119.06	119.02	118.92	118.63	118.64	118.50	118.46	118.77	118.55	118.24
Type >	POC	Groundwater Level (ft-MSL)	2399.46	2399.34	2402.48	2402.52	2402.62	2402.91	2402.90	2403.04	2403.08	2402.77	2402.99	2403.30
		Corrected Groundwater Level (ft-MSL)	2399.46	2399.34	2402.48	2402.52	2402.62	2402.91	2402.90	2403.04	2403.08	2402.77	2402.99	2403.30
Well >	MW-225	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Program>	BICA	Groundwater Level (ft-bTOC)	82.84	83.00	82.59	82.68	82.51	81.89	81.74	81.72	81.53	81.97	81.68	81.35
Type >	POC	Groundwater Level (ft-MSL)	2391.29	2391.13	2394.33	2394.24	2394.41	2395.03	2395.18	2395.20	2395.39	2394.95	2395.24	2395.57
		Corrected Groundwater Level (ft-MSL)	2391.29	2391.13	2394.33	2394.24	2394.41	2395.03	2395.18	2395.20	2395.39	2394.95	2395.24	2395.57
Well >	MW-225A	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Program>	BICA	Groundwater Level (ft-bTOC)	83.23	83.29	82.91	82.98	82.84	82.22	82.03	82.04	81.86	82.28	82.01	81.67
Type >	POC	Groundwater Level (ft-MSL)	2390.96	2390.90	2394.34	2394.27	2394.41	2395.03	2395.22	2395.21	2395.39	2394.97	2395.24	2395.58
		Corrected Groundwater Level (ft-MSL)	2390.96	2390.90	2394.34	2394.27	2394.41	2395.03	2395.22	2395.21	2395.39	2394.97	2395.24	2395.58
Well >	MW-227	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Program>	BICA	Groundwater Level (ft-bTOC)	90.04	96.00	89.81	89.80	89.65	89.20	88.28	88.83	88.39	88.24	88.54	88.45
Type >	POC	Groundwater Level (ft-MSL)	2393.35	2387.39	2396.33	2396.34	2396.49	2396.94	2397.86	2397.31	2397.75	2397.90	2397.60	2397.69
		Corrected Groundwater Level (ft-MSL)	2393.35	2387.39	2396.33	2396.34	2396.49	2396.94	2397.86	2397.31	2397.75	2397.90	2397.60	2397.69
Well >	MW-227A	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Program>	BICA	Groundwater Level (ft-bTOC)	90.84	90.30	90.55	90.56	90.38	89.93	89.11	89.57	89.07	89.05	89.22	89.12
Type >	POC	Groundwater Level (ft-MSL)	2392.94	2393.48	2396.26	2396.25	2396.43	2396.88	2397.70	2397.24	2397.74	2397.76	2397.59	2397.69
		Corrected Groundwater Level (ft-MSL)	2392.94	2393.48	2396.26	2396.25	2396.43	2396.88	2397.70	2397.24	2397.74	2397.76	2397.59	2397.69
Well >	RW-228	LNAPL Thickness (feet)	4.46	4.79	3.92	3.74	3.12	2.60	2.15	1.97	2.00	2.76	3.98	4.20
Program>	BICA	Groundwater Level (ft-bTOC)	74.61	74.99	73.60	73.34	72.52	71.78	70.95	71.04	71.31	72.50	74.15	74.15
Type >	Recovery	Groundwater Level (ft-MSL)	2386.60	2386.22	2390.32	2390.58	2391.40	2392.14	2392.97	2392.88	2392.61	2391.42	2389.77	2389.77
		Corrected Groundwater Level (ft-MSL)	2390.35	2390.24	2393.61	2393.72	2394.02	2394.32	2394.78	2394.53	2394.29	2393.74	2393.11	2393.30

ft-TOC : Feet Below Top of Casing, ft-MSL : Feet Mean Sea Level, POC : Point of Compliance

Table VI.B.2.b. - Historical Monitor Well Water Levels

Alon USA Big Spring Refinery [CP-50140]

		Data	FLUID LEVEL MEASUREMENT EVENTS									STATISTICS		
			Jan-20	Jul-20	Jan-21	Jul-21	Jan-22	Jul-22	Jan-23	Jul-23	Jan-24	Maximum	Minimum	Average
Well >	**MW-223**	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**	**0.00**
Program>	**BICA**	Groundwater Level (ft-bTOC)	103.81	100.19	103.09	102.43	103.60	103.19	103.65	103.45	104.19	**104.69**	**100.19**	**103.72**
Type >	**POC**	Groundwater Level (ft-MSL)	2401.49	2405.11	2402.21	2402.87	2401.70	2402.11	2401.65	2401.85	2401.11	**2405.11**	**2397.48**	**2401.28**
		Corrected Groundwater Level (ft-MSL)	2401.49	2405.11	2402.21	2402.87	2401.70	2402.11	2401.65	2401.85	2401.11	**2405.11**	**2397.48**	**2401.28**
Well >	**MW-223A**	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**	**0.00**
Program>	**BICA**	Groundwater Level (ft-bTOC)	105.04	102.11	104.23	103.72	104.74	104.42	104.81	104.69	105.33	**105.78**	**102.11**	**104.89**
Type >	**POC**	Groundwater Level (ft-MSL)	2401.42	2404.35	2402.23	2402.74	2401.72	2402.04	2401.65	2401.77	2401.13	**2404.35**	**2397.91**	**2401.43**
		Corrected Groundwater Level (ft-MSL)	2401.42	2404.35	2402.23	2402.74	2401.72	2402.04	2401.65	2401.77	2401.13	**2404.35**	**2397.91**	**2401.43**
Well >	**MW-224**	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**	**0.00**
Program>	**BICA**	Groundwater Level (ft-bTOC)	118.80	117.60	117.89	118.04	118.38	118.51	118.79	118.74	119.21	**119.47**	**117.60**	**118.81**
Type >	**POC**	Groundwater Level (ft-MSL)	2403.12	2404.32	2404.03	2403.88	2403.54	2403.41	2403.13	2403.18	2402.71	**2404.32**	**2399.33**	**2402.81**
		Corrected Groundwater Level (ft-MSL)	2403.12	2404.32	2404.03	2403.88	2403.54	2403.41	2403.13	2403.18	2402.71	**2404.32**	**2399.33**	**2402.81**
Well >	**MW-224A**	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**	**0.00**
Program>	**BICA**	Groundwater Level (ft-bTOC)	118.44	117.22	117.55	117.68	118.01	118.15	118.43	118.41	118.95	**119.11**	**117.22**	**118.46**
Type >	**POC**	Groundwater Level (ft-MSL)	2403.10	2404.32	2403.99	2403.86	2403.53	2403.39	2403.11	2403.13	2402.59	**2404.32**	**2399.34**	**2402.78**
		Corrected Groundwater Level (ft-MSL)	2403.10	2404.32	2403.99	2403.86	2403.53	2403.39	2403.11	2403.13	2402.59	**2404.32**	**2399.34**	**2402.78**
Well >	**MW-225**	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**	**0.00**
Program>	**BICA**	Groundwater Level (ft-bTOC)	81.73	81.65	81.65	81.26	80.89	80.33	80.43	80.07	80.36	**83.00**	**80.07**	**81.61**
Type >	**POC**	Groundwater Level (ft-MSL)	2395.19	2395.27	2395.27	2395.66	2396.03	2396.59	2396.49	2396.85	2396.56	**2396.85**	**2391.13**	**2395.04**
		Corrected Groundwater Level (ft-MSL)	2395.19	2395.27	2395.27	2395.66	2396.03	2396.59	2396.49	2396.85	2396.56	**2396.85**	**2391.13**	**2395.04**
Well >	**MW-225A**	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**	**0.00**
Program>	**BICA**	Groundwater Level (ft-bTOC)	82.06	81.97	81.97	81.59	81.20	80.64	80.74	80.39	80.65	**83.29**	**80.39**	**81.93**
Type >	**POC**	Groundwater Level (ft-MSL)	2395.19	2395.28	2395.28	2395.66	2396.05	2396.61	2396.51	2396.86	2396.60	**2396.86**	**2390.90**	**2395.03**
		Corrected Groundwater Level (ft-MSL)	2395.19	2395.28	2395.28	2395.66	2396.05	2396.61	2396.51	2396.86	2396.60	**2396.86**	**2390.90**	**2395.03**
Well >	**MW-227**	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**	**0.00**
Program>	**BICA**	Groundwater Level (ft-bTOC)	88.45	88.66	89.06	88.65	87.70	86.55	86.96	86.73	87.51	**96.00**	**86.55**	**88.83**
Type >	**POC**	Groundwater Level (ft-MSL)	2397.69	2397.48	2397.08	2397.49	2398.44	2399.59	2399.18	2399.41	2398.63	**2399.59**	**2387.39**	**2397.04**
		Corrected Groundwater Level (ft-MSL)	2397.69	2397.48	2397.08	2397.49	2398.44	2399.59	2399.18	2399.41	2398.63	**2399.59**	**2387.39**	**2397.04**
Well >	**MW-227A**	LNAPL Thickness (feet)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**	**0.00**
Program>	**BICA**	Groundwater Level (ft-bTOC)	89.10	89.33	89.73	89.32	88.43	87.43	87.66	87.53	88.39	**90.84**	**87.43**	**89.27**
Type >	**POC**	Groundwater Level (ft-MSL)	2397.71	2397.48	2397.08	2397.49	2398.38	2399.38	2399.15	2399.28	2398.42	**2399.38**	**2392.94**	**2397.25**
		Corrected Groundwater Level (ft-MSL)	2397.71	2397.48	2397.08	2397.49	2398.38	2399.38	2399.15	2399.28	2398.42	**2399.38**	**2392.94**	**2397.25**
Well >	**RW-228**	LNAPL Thickness (feet)	3.61	3.33	1.89	2.18	1.84	1.71	1.67	1.78	1.79	**4.79**	**1.67**	**2.83**
Program>	**BICA**	Groundwater Level (ft-bTOC)	73.31	72.87	71.02	71.33	70.74	70.47	70.26	70.26	70.50	**74.99**	**70.26**	**72.18**
Type >	**Recovery**	Groundwater Level (ft-MSL)	2390.61	2391.05	2392.90	2392.59	2393.18	2393.45	2393.66	2393.66	2393.42	**2393.66**	**2386.22**	**2391.49**
		Corrected Groundwater Level (ft-MSL)	2393.64	2393.85	2394.49	2394.42	2394.73	2394.89	2395.06	2395.16	2394.89	**2395.16**	**2390.24**	**2393.86**

ft-TOC : Feet Below Top of Casing, ft-MSL : Feet Mean Sea Level, POC : Point of Compliance

Table VI.B.2.c

Upper and Lower Limits of the Ogallala Aquifer

Alon USA LP - Big Spring Refinery - Big Spring, Texas

WELL NUMBER	Top Grade (MSL)	Top of Saturation (ft-BGL)	Top of Saturation (ft-MSL)	Top of Ogallala FM Gravel (ft-BGL)	Top of Ogallala FM Gravel (ft-MSL)	Top of Dockum FM Clay (ft-BGL)	Top of Dockum FM Clay (ft-MSL)	Top Ogallala Aquifer (ft-MSL)	Base Ogallala Aquifer (ft-MSL)	Thickness Ogallala Aquifer (feet)	Saturated Sands (feet)	Saturated Gravels (feet)	% Saturated Gravels (%)
BOUNDARY INTERIM CORRECTIVE ACTION [BICA AREA]													
IW-58	2435.09	70.0	2365.1	85.0	2350.1	98.0	2337.1	2365.1	2337.1	28.0	15.0	13.0	46.4%
IW-58A	2435.88	70.0	2365.9	85.0	2350.9	98.0	2337.9	2365.9	2337.9	28.0	15.0	13.0	46.4%
MW-78	2415.90	40.0	2375.9	66.0	2349.9	72.0	2343.9	2375.9	2343.9	32.0	26.0	6.0	18.8%
MW-78A	2416.19	40.0	2376.2	66.0	2350.2	72.0	2344.2	2376.2	2344.2	32.0	26.0	6.0	18.8%
MW-79	2436.21	52.0	2384.2	92.0	2344.2	111.0	2325.2	2384.2	2325.2	59.0	40.0	19.0	32.2%
MW-79A	2436.01	52.0	2384.0	92.0	2344.0	111.0	2325.0	2384.0	2325.0	59.0	40.0	19.0	32.2%
MW-80	2440.55	62.0	2378.6	80.0	2360.6	108.0	2332.6	2378.6	2332.6	46.0	18.0	28.0	60.9%
MW-80A	2439.85	62.0	2377.9	80.0	2359.9	108.0	2331.9	2377.9	2331.9	46.0	18.0	28.0	60.9%
RW-106	2440.41	58.0	2382.4	NE	NE	NP	NP	2382.4	unknown	unknown	unknown	unknown	unknown
MW-109	2367.68	4.0	2363.7	20.0	2347.7	24.0	2343.7	2363.7	2343.7	20.0	16.0	4.0	20.0%
MW-109A	2367.48	4.0	2363.5	20.0	2347.5	24.0	2343.5	2363.5	2343.5	20.0	16.0	4.0	20.0%
RW-112	2385.54	23.0	2362.5	40.0	2345.5	44.0	2341.5	2362.5	2341.5	21.0	17.0	4.0	19.0%
MW-125	2438.08	69.0	2369.1	86.0	2352.1	90.0	2348.1	2369.1	2348.1	21.0	17.0	4.0	19.0%
MW-125A	2437.98	69.0	2369.0	86.0	2352.0	90.0	2348.0	2369.0	2348.0	21.0	17.0	4.0	19.0%
RW-141	2402.71	39.0	2363.7	56.0	2346.7	60.0	2342.7	2363.7	2342.7	21.0	17.0	4.0	19.0%
RW-142	2431.86	65.0	2366.9	84.0	2347.9	88.0	2343.9	2366.9	2343.9	23.0	19.0	4.0	17.4%
RW-144	2438.26	70.0	2368.3	82.0	2356.3	97.0	2341.3	2368.3	2341.3	27.0	12.0	15.0	55.6%
RW-145	2429.25	60.0	2369.3	80.0	2349.3	86.0	2343.3	2369.3	2343.3	26.0	20.0	6.0	23.1%
RW-146	2437.86	68.0	2369.9	94.0	2343.9	100.0	2337.9	2369.9	2337.9	32.0	26.0	6.0	18.8%
RW-147	2445.33	79.0	2366.3	90.0	2355.3	104.0	2341.3	2366.3	2341.3	25.0	11.0	14.0	56.0%
IW-149	2437.02	60.0	2377.0	85.0	2352.0	96.0	2341.0	2377.0	2341.0	36.0	25.0	11.0	30.6%
IW-149A	2437.01	60.0	2377.0	85.0	2352.0	96.0	2341.0	2377.0	2341.0	36.0	25.0	11.0	30.6%
IW-150	2391.61	28.0	2363.6	38.0	2353.6	48.0	2343.6	2363.6	2343.6	20.0	10.0	10.0	50.0%
IW-150A	2391.61	28.0	2363.6	38.0	2353.6	48.0	2343.6	2363.6	2343.6	20.0	10.0	10.0	50.0%
MW-152	2473.21	79.0	2394.2	108.0	2365.2	116.0	2357.2	2394.2	2357.2	37.0	29.0	8.0	21.6%
MW-152A	2473.20	79.0	2394.2	108.0	2365.2	116.0	2357.2	2394.2	2357.2	37.0	29.0	8.0	21.6%
MW-153	2453.38	60.0	2393.4	80.0	2373.4	88.0	2365.4	2393.4	2365.4	28.0	20.0	8.0	28.6%
MW-153A	2453.65	60.0	2393.7	80.0	2373.7	88.0	2365.7	2393.7	2365.7	28.0	20.0	8.0	28.6%
MW-154	2448.90	66.0	2382.9	94.0	2354.9	102.0	2346.9	2382.9	2346.9	36.0	28.0	8.0	22.2%

Table VI.B.2.c

Upper and Lower Limits of the Ogallala Aquifer

Alon USA LP - Big Spring Refinery - Big Spring, Texas

WELL NUMBER	Top Grade (MSL)	Top of Saturation (ft-BGL)	Top of Saturation (ft-MSL)	Top of Ogallala FM Gravel (ft-BGL)	Top of Ogallala FM Gravel (ft-MSL)	Top of Dockum FM Clay (ft-BGL)	Top of Dockum FM Clay (ft-MSL)	Top Ogallala Aquifer (ft-MSL)	Base Ogallala Aquifer (ft-MSL)	Thickness Ogallala Aquifer (feet)	Saturated Sands (feet)	Saturated Gravels (feet)	% Saturated Gravels (%)
MW-154A	2448.91	66.0	2382.9	94.0	2354.9	102.0	2346.9	2382.9	2346.9	36.0	28.0	8.0	22.2%
MW-155	2452.7	69.0	2383.7	98.0	2354.7	106.0	2346.7	2383.7	2346.7	37.0	29.0	8.0	21.6%
MW-155A	2452.2	69.0	2383.2	98.0	2354.2	106.0	2346.2	2383.2	2346.2	37.0	29.0	8.0	21.6%
MW-163	2394.45	15.0	2379.5	42.0	2352.5	48.0	2346.5	2379.5	2346.5	33.0	27.0	6.0	18.2%
MW-163A	2397.59	15.0	2382.6	42.0	2355.6	48.0	2349.6	2382.6	2349.6	33.0	27.0	6.0	18.2%
MW-165	2450.41	70.0	2380.4	103.0	2347.4	108.0	2342.4	2380.4	2342.4	38.0	33.0	5.0	13.2%
MW-165A	2450.12	70.0	2380.1	103.0	2347.1	108.0	2342.1	2380.1	2342.1	38.0	33.0	5.0	13.2%
MW-166	2439.29	69.0	2370.3	94.0	2345.3	95.0	2344.3	2370.3	2344.3	26.0	25.0	1.0	3.8%
MW-166A	2439.30	69.0	2370.3	94.0	2345.3	95.0	2344.3	2370.3	2344.3	26.0	25.0	1.0	3.8%
RW-179	2433.50	48.0	2385.5	NE	NE	76.0	2357.5	2385.5	2357.5	28.0	28.0	0.0	0.0%
RW-192	2459.94	73.0	2386.9	NE	NE	106.0	2353.9	2386.9	2353.9	33.0	33.0	0.0	0.0%
RW-194	2441.50	67.0	2374.5	93.0	2348.5	106.0	2335.5	2374.5	2335.5	39.0	26.0	13.0	33.3%
RW-195	2432.20	63.0	2369.2	90.0	2342.2	93.0	2339.2	2369.2	2339.2	30.0	27.0	3.0	10.0%
MW-214	2474.45	79.0	2395.5	115.0	2359.5	120.0	2354.5	2395.5	2354.5	41.0	36.0	5.0	12.2%
MW-214A	2474.58	79.0	2395.6	115.0	2359.6	120.0	2354.6	2395.6	2354.6	41.0	36.0	5.0	12.2%
MW-215	2480.19	92.0	2388.2	125.0	2355.2	128.0	2352.2	2388.2	2352.2	36.0	33.0	3.0	8.3%
MW-215A	2480.44	92.0	2388.4	125.0	2355.4	128.0	2352.4	2388.4	2352.4	36.0	33.0	3.0	8.3%
MW-218	2464.84	81.0	2383.8	112.0	2352.8	116.0	2348.8	2383.8	2348.8	35.0	31.0	4.0	11.4%
MW-218A	2464.82	81.0	2383.8	112.0	2352.8	116.0	2348.8	2383.8	2348.8	35.0	31.0	4.0	11.4%
MW-220	2489.46	95.0	2394.5	130.0	2359.5	135.0	2354.5	2394.5	2354.5	40.0	35.0	5.0	12.5%
MW-220A	2490.05	95.0	2395.1	130.0	2360.1	135.0	2355.1	2395.1	2355.1	40.0	35.0	5.0	12.5%
MW-221	2509.49	115.0	2394.5	147.0	2362.5	155.0	2354.5	2394.5	2354.5	40.0	32.0	8.0	20.0%
MW-221A	2509.43	115.0	2394.4	147.0	2362.4	155.0	2354.4	2394.4	2354.4	40.0	32.0	8.0	20.0%
MW-223	2502.17	101.0	2401.2	139.0	2363.2	145.0	2357.2	2401.2	2357.2	44.0	38.0	6.0	13.6%
MW-223A	2503.51	101.0	2402.5	139.0	2364.5	145.0	2358.5	2402.5	2358.5	44.0	38.0	6.0	13.6%
MW-224	2518.80	120.0	2398.8	150.0	2368.8	157.0	2361.8	2398.8	2361.8	37.0	30.0	7.0	18.9%
MW-224A	2518.45	120.0	2398.5	150.0	2368.5	157.0	2361.5	2398.5	2361.5	37.0	30.0	7.0	18.9%
MW-225	2474.13	78.0	2396.1	105.0	2369.1	110.0	2364.1	2396.1	2364.1	32.0	27.0	5.0	15.6%
MW-225A	2474.19	78.0	2396.2	105.0	2369.2	110.0	2364.2	2396.2	2364.2	32.0	27.0	5.0	15.6%
MW-227	2483.39	83.0	2400.4	117.0	2366.4	124.0	2359.4	2400.4	2359.4	41.0	34.0	7.0	17.1%

Table VI.B.2.c

Upper and Lower Limits of the Ogallala Aquifer

Alon USA LP - Big Spring Refinery - Big Spring, Texas

WELL NUMBER	Top Grade (MSL)	Top of Saturation (ft-BGL)	Top of Saturation (ft-MSL)	Top of Ogallala FM Gravel (ft-BGL)	Top of Ogallala FM Gravel (ft-MSL)	Top of Dockum FM Clay (ft-BGL)	Top of Dockum FM Clay (ft-MSL)	Top Ogallala Aquifer (ft-MSL)	Base Ogallala Aquifer (ft-MSL)	Thickness Ogallala Aquifer (feet)	Saturated Sands (feet)	Saturated Gravels (feet)	% Saturated Gravels (%)
MW-227A	2483.78	83.0	2400.8	117.0	2366.8	124.0	2359.8	2400.8	2359.8	41.0	34.0	7.0	17.1%
RW-228	2461.21	67.0	2394.2	NE	NE	97.0	2364.2	2394.2	NE	30.0	30.0	NE	0.0%
MW-229	2468.42	74.5	2393.9	NE	NE	115.0	2353.4	2393.9	NE	40.5	40.5	NE	0.0%
MW-230	2463.80	75.0	2388.8	97.0	2366.8	NE	NE	2388.8	2366.8	NE	22.0	NE	NFP
MW-230A	2463.74	75.0	2388.7	97.0	2366.7	109.0	2354.7	2388.7	2366.7	34.0	22.0	12.0	35.3%
MW-231	2446.22	60.5	2385.7	NE	NE	90.0	2356.2	2385.7	NE	29.5	29.5	NE	0.0%
MW-232	2437.10	66.0	2371.1	NE	NE	102.0	2335.1	2371.1	NE	36.0	36.0	NE	0.0%
MW-233	2446.09	65.0	2381.1	NE	NE	106.0	2340.1	2381.1	NE	41.0	41.0	NE	0.0%
MW-234	2470.70	85.0	2385.7	NE	NE	122.0	2348.7	2385.7	NE	37.0	37.0	NE	0.0%
Maximum	**2518.8**	**120.0**	**2402.5**	**150.0**	**2373.7**	**157.0**	**2365.7**	**2402.5**	**2366.8**	**59.0**	**41.0**	**28.0**	**60.9%**
Minimum	**2367.5**	**4.0**	**2362.5**	**20.0**	**2342.2**	**24.0**	**2325.0**	**2362.5**	**2325.0**	**20.0**	**10.0**	**0.0**	**0.0%**
Average	**2449.8**	**67.6**	**2382.2**	**93.6**	**2355.8**	**101.5**	**2348.2**	**2382.2**	**2348.5**	**33.9**	**26.9**	**7.7**	**20.6%**
CONTAINER STORAGE AREA													
TH-5	2501.71	NIR	NIR	131.0	2370.7	144.0	2357.7	NIR	2357.7	unknown	unknown	unknown	unknown
MW-64	2498.90	98.0	2400.9	144.0	2354.9	150.0	2348.9	2400.9	2348.9	52.0	46.0	6.0	11.5%
MW-64A	2499.33	98.0	2401.3	144.0	2355.3	150.0	2349.3	2401.3	2349.3	52.0	46.0	6.0	11.5%
IW-95	2502.15	90.0	2412.2	138.0	2364.2	141.0	2361.2	2412.2	2361.2	51.0	48.0	3.0	5.9%
Maximum	**2502.2**	**98.0**	**2412.2**	**144.0**	**2370.7**	**150.0**	**2361.2**	**2412.2**	**2361.2**	**52.0**	**48.0**	**6.0**	**11.5%**
Minimum	**2498.9**	**90.0**	**2400.9**	**131.0**	**2354.9**	**141.0**	**2348.9**	**2400.9**	**2348.9**	**51.0**	**46.0**	**3.0**	**5.9%**
Average	**2500.5**	**95.3**	**2404.8**	**139.3**	**2361.3**	**146.3**	**2354.3**	**2404.8**	**2354.3**	**51.7**	**46.7**	**5.0**	**9.7%**
SITE E LAND TREATMENT UNIT (closed)													
MW-38	2497.28	96.0	2401.3	110.0	2387.3	144.0	2353.3	2401.3	2353.3	48.0	14.0	34.0	70.8%
MW-38A	2497.41	96.0	2401.4	110.0	2387.4	144.0	2353.4	2401.4	2353.4	48.0	14.0	34.0	70.8%
MW-39	2482.59	80.0	2402.6	99.0	2383.6	129.0	2353.6	2402.6	2353.6	49.0	19.0	30.0	61.2%
MW-39A	2482.88	80.0	2402.9	99.0	2383.9	129.0	2353.9	2402.9	2353.9	49.0	19.0	30.0	61.2%
MW-40	2477.03	88.0	2389.0	108.0	2369.0	127.5	2349.5	2389.0	2349.5	39.5	20.0	19.5	49.4%
MW-40A	2477.07	88.0	2389.1	108.0	2369.1	127.5	2349.6	2389.1	2349.6	39.5	20.0	19.5	49.4%
MW-41	2486.26	91.0	2395.3	106.5	2379.8	130.0	2356.3	2395.3	2356.3	39.0	15.5	23.5	60.3%
MW-41A	2486.80	91.0	2395.8	106.5	2380.3	130.0	2356.8	2395.8	2356.8	39.0	15.5	23.5	60.3%

Table VI.B.2.c

Upper and Lower Limits of the Ogallala Aquifer

Alon USA LP - Big Spring Refinery - Big Spring, Texas

WELL NUMBER	Top Grade (MSL)	Top of Saturation (ft-BGL)	Top of Saturation (ft-MSL)	Top of Ogallala FM Gravel (ft-BGL)	Top of Ogallala FM Gravel (ft-MSL)	Top of Dockum FM Clay (ft-BGL)	Top of Dockum FM Clay (ft-MSL)	Top Ogallala Aquifer (ft-MSL)	Base Ogallala Aquifer (ft-MSL)	Thickness Ogallala Aquifer (feet)	Saturated Sands (feet)	Saturated Gravels (feet)	% Saturated Gravels (%)
Maximum	**2497.4**	**96.0**	**2402.9**	**110.0**	**2387.4**	**144.0**	**2356.8**	**2402.9**	**2356.8**	**49.0**	**20.0**	**34.0**	**70.8%**
Minimum	**2477.0**	**80.0**	**2389.0**	**99.0**	**2369.0**	**127.5**	**2349.5**	**2389.0**	**2349.5**	**39.0**	**14.0**	**19.5**	**49.4%**
Average	**2485.9**	**88.8**	**2397.2**	**105.9**	**2380.0**	**132.6**	**2353.3**	**2397.2**	**2353.3**	**43.9**	**17.1**	**26.8**	**60.4%**
SITE H LAND TREATMENT UNIT (closed)													
MW-53	2508.11	96.0	2412.1	111.0	2397.1	137.0	2371.1	2412.1	2371.1	41.0	15.0	26.0	63.4%
MW-53A	2507.99	96.0	2412.0	111.0	2397.0	137.0	2371.0	2412.0	2371.0	41.0	15.0	26.0	63.4%
MW-54	2505.16	98.0	2407.2	100.0	2405.2	138.0	2367.2	2407.2	2367.2	40.0	2.0	38.0	95.0%
MW-54A	2505.31	98.0	2407.3	100.0	2405.3	138.0	2367.3	2407.3	2367.3	40.0	2.0	38.0	95.0%
MW-74	2506.61	95.0	2411.6	NE	NE	146.0	2360.6	2411.6	2360.6	51.0	51.0	0.0	0.0%
MW-74A	2506.54	95.0	2411.5	NE	NE	146.0	2360.5	2411.5	2360.5	51.0	51.0	0.0	0.0%
MW-75	2506.66	96.0	2410.7	150.0	2356.7	154.0	2352.7	2410.7	2352.7	58.0	54.0	4.0	6.9%
MW-75A	2506.65	96.0	2410.7	150.0	2356.7	154.0	2352.7	2410.7	2352.7	58.0	54.0	4.0	6.9%
MW-77	2508.77	101.0	2407.8	148.0	2360.8	150.0	2358.8	2407.8	2358.8	49.0	47.0	2.0	4.1%
MW-77A	2508.99	101.0	2408.0	148.0	2361.0	150.0	2359.0	2408.0	2359.0	49.0	47.0	2.0	4.1%
MW-52	2515.10	115.0	2400.1	137.0	2378.1	157.0	2358.1	2400.1	2358.1	42.0	22.0	20.0	47.6%
MW-52A	2515.08	115.0	2400.1	137.0	2378.1	157.0	2358.1	2400.1	2358.1	42.0	22.0	20.0	47.6%
MW-76	2519.40	101.0	2418.4	NE	NE	158.0	2361.4	2418.4	2361.4	57.0	57.0	0.0	0.0%
MW-76A	2518.99	101.0	2418.0	NE	NE	158.0	2361.0	2418.0	2361.0	57.0	57.0	0.0	0.0%
Maximum	**2519.4**	**115.0**	**2418.4**	**150.0**	**2405.3**	**158.0**	**2371.1**	**2418.4**	**2371.1**	**58.0**	**57.0**	**38.0**	**95.0%**
Minimum	**2505.2**	**95.0**	**2400.1**	**100.0**	**2356.7**	**137.0**	**2352.7**	**2400.1**	**2352.7**	**40.0**	**2.0**	**0.0**	**0.0%**
Average	**2510.0**	**100.3**	**2409.7**	**129.2**	**2379.6**	**148.6**	**2361.4**	**2409.7**	**2361.4**	**48.3**	**35.4**	**12.9**	**31.0%**

NE - Unit Not Penetrated by Total Depth
NP - Unit Not Present
NIR - Information Not In Records

ft-BGL - Feet Below Grade level
ft-MSL - Feet referenced to Mean Sea Level

Table VI.B.2.e. - HISTORICAL AQUIFER FLOW CHARACTERISTICS

Alon USA, LP - Big Spring Refinery - Big Spring, Texas

UNIT = **SITE E LTU**

SATURATED ZONE = **UPPER (Saturated Sands of Ogallala Aquifer)**

LINEAR DISTANCE = **(1) 803 feet, (2) 373 feet** *(see NOTE)*

HYDRAULIC CONDUCTIVITY = **513 gpm per sq. foot**

POROSITY = **27%**

Event	NOTE	UPGRADIENT Well na	UPGRADIENT Water Level feet-MSL	DOWNGRADIENT Well na	DOWNGRADIENT Water Level feet-MSL	Head Difference feet	FLOW GRADIENT feet/foot	FLOW VELOCITY feet/day	FLOW VELOCITY feet/year
Oct-87	1	MW-38	2400.06	MW-40	2396.47	3.59	0.0045	1.14	414.5
Feb-88	1	MW-38	2399.87	MW-40	2396.42	3.45	0.0043	1.09	398.3
Jan-89	1	MW-38	2399.88	MW-40	2396.06	3.82	0.0048	1.21	441.1
Apr-89	1	MW-38	2399.89	MW-40	2395.97	3.92	0.0049	1.24	452.6
Jul-89	1	MW-38	2399.72	MW-40	2395.94	3.78	0.0047	1.20	436.4
Nov-89	1	MW-38	2399.97	MW-40	2395.70	4.27	0.0053	1.35	493.0
Jan-94	2	MW-39	2397.95	MW-40	2396.34	1.61	0.0043	1.10	400.2
Mar-94	2	MW-39	2397.88	MW-40	2396.30	1.58	0.0042	1.08	392.7
Jul-94	2	MW-39	2397.67	MW-40	2396.14	1.53	0.0041	1.04	380.3
Oct-94	2	MW-39	2397.80	MW-40	2396.18	1.62	0.0043	1.10	402.7
JAN-95	2	MW-39	2397.51	MW-40	2395.89	1.62	0.0043	1.10	402.7
APR-95	2	MW-39	2397.30	MW-40	2395.72	1.58	0.0042	1.08	392.7
OCT-95	2	MW-39	2396.97	MW-40	2395.39	1.58	0.0042	1.08	392.7
JAN-96	2	MW-39	2396.79	MW-40	2395.16	1.63	0.0044	1.11	405.2
JUL-96	2	MW-39	2396.30	MW-40	2394.64	1.66	0.0045	1.13	412.6
JAN-97	2	MW-39	2396.14	MW-40	2394.44	1.70	0.0046	1.16	422.6
JUL-97	2	MW-39	2396.26	MW-40	2394.58	1.68	0.0045	1.14	417.6
JAN-98	2	MW-39	2396.22	MW-40	2394.68	1.54	0.0041	1.05	382.8
JUL-98	2	MW-39	2396.03	MW-40	2394.50	1.53	0.0041	1.04	380.3
JAN-99	2	MW-39	2395.93	MW-40	2394.19	1.74	0.0047	1.18	432.5
JUL-99	2	MW-39	2395.73	MW-40	2394.01	1.72	0.0046	1.17	427.5
JAN-00	2	MW-39	2395.33	MW-40	2393.74	1.59	0.0043	1.08	395.2
APR-00	2	MW-39	2394.98	MW-40	2393.50	1.48	0.0040	1.01	367.9
JUL-00	2	MW-39	2394.98	MW-40	2393.48	1.50	0.0040	1.02	372.8
JAN-01	2	MW-39	2394.68	MW-40	2393.17	1.51	0.0040	1.03	375.3
JUL-01	2	MW-39	2394.62	MW-40	2393.01	1.61	0.0043	1.10	400.2
JAN-02	2	MW-39	2394.95	MW-40	2393.12	1.83	0.0049	1.25	454.9
JUL-02	2	MW-39	2394.42	MW-40	2392.89	1.53	0.0041	1.04	380.3
Jul-02	2	MW-39	2394.42	MW-40	2392.89	1.53	0.0041	1.04	380.3
Jan-03	2	MW-39	2394.25	MW-40	2392.65	1.60	0.0043	1.09	397.7
Jul-03	2	MW-39	2394.00	MW-40	2392.46	1.54	0.0041	1.05	382.8
Jan-04	2	MW-39	2393.75	MW-40	2392.18	1.57	0.0042	1.07	390.2
Jul-04	2	MW-39	2393.58	MW-40	2392.01	1.57	0.0042	1.07	390.2
Jan-05	2	MW-39	2394.64	MW-40	2392.89	1.75	0.0047	1.19	435.0
Jul-05	2	MW-39	2396.92	MW-40	2393.82	3.10	0.0083	2.11	770.5
Jan-06	2	MW-39	2394.89	MW-40	2393.61	1.28	0.0034	0.87	318.2
Jul-06	2	MW-39	2394.81	MW-40	2393.48	1.33	0.0036	0.91	330.6
Jan-07	2	MW-39	2394.66	MW-40	2393.35	1.31	0.0035	0.89	325.6
Jul-07	2	MW-39	2395.17	MW-40	2393.73	1.44	0.0039	0.98	357.9
Jan-08	2	MW-39	2395.51	MW-40	2394.36	1.15	0.0031	0.78	285.8

Table VI.B.2.e. - HISTORICAL AQUIFER FLOW CHARACTERISTICS

Alon USA, LP - Big Spring Refinery - Big Spring, Texas

UNIT = **SITE E LTU**

SATURATED ZONE = **UPPER (Saturated Sands of Ogallala Aquifer)**

LINEAR DISTANCE = **(1) 803 feet, (2) 373 feet** *(see NOTE)*

HYDRAULIC CONDUCTIVITY = **513 gpm per sq. foot**

POROSITY = **27%**

Event	NOTE	UPGRADIENT Well na	UPGRADIENT Water Level feet-MSL	DOWNGRADIENT Well na	DOWNGRADIENT Water Level feet-MSL	Head Difference feet	FLOW GRADIENT feet/foot	FLOW VELOCITY feet/day	FLOW VELOCITY feet/year
Jul-08	2	MW-39	2395.53	MW-40	2394.39	1.14	0.0031	0.78	283.4
Jan-09	2	MW-39	2395.21	MW-40	2393.98	1.23	0.0033	0.84	305.7
Jul-09	2	MW-39	2394.65	MW-40	2393.39	1.26	0.0034	0.86	313.2
Jan-10	2	MW-39	2394.09	MW-40	2392.88	1.21	0.0032	0.82	300.8
Jul-10	2	MW-39	2394.53	MW-40	2393.24	1.29	0.0035	0.88	320.6
Jan-11	2	MW-39	2394.85	MW-40	2393.55	1.30	0.0035	0.89	323.1
Jul-11	2	MW-39	2394.75	MW-40	2393.78	0.97	0.0026	0.66	241.1
Jan-12	2	MW-39	2393.77	MW-40	2392.87	0.90	0.0024	0.61	223.7
Jul-12	2	MW-39	2393.62	MW-40	2392.56	1.06	0.0028	0.72	263.5
Jan-13	2	MW-39	2393.47	MW-40	2392.55	0.92	0.0025	0.63	228.7
Jul-13	2	MW-39	2393.26	MW-40	2392.26	1.00	0.0027	0.68	248.6
Jan-14	2	MW-39	2392.94	MW-40	2392.04	0.90	0.0024	0.61	223.7
Mar-15	2	MW-39	2392.95	MW-40	2392.04	0.91	0.0024	0.62	226.2
Jul-15	2	MW-39	2392.93	MW-40	2392.13	0.80	0.0021	0.54	198.9
Jan-16	2	MW-39	2393.16	MW-40	2392.43	0.73	0.0020	0.50	181.5
Jul-16	2	MW-39	2393.43	MW-40	2392.65	0.78	0.0021	0.53	193.9
Jan-17	2	MW-39	2393.83	MW-40	2393.15	0.68	0.0018	0.46	169.0
Jul-17	2	MW-39	2393.87	MW-40	2393.11	0.76	0.0020	0.52	188.9
Jan-18	2	MW-39	2393.49	MW-40	2392.53	0.96	0.0026	0.65	238.6
Jul-18	2	MW-39	2393.39	MW-40	2392.43	0.96	0.0026	0.65	238.6
Jan-19	2	MW-39	2393.34	MW-40	2392.10	1.24	0.0033	0.84	308.2
Jul-19	2	MW-39	2393.56	MW-40	2392.26	1.30	0.0035	0.89	323.1
Jan-20	2	MW-39	2393.53	MW-40	2392.48	1.05	0.0028	0.72	261.0
Jul-20	2	MW-39	2393.68	MW-40	2392.56	1.12	0.0030	0.76	278.4
Jan-21	2	MW-39	2393.89	MW-40	2392.79	1.10	0.0029	0.75	273.4
Jul-21	2	MW-39	2393.95	MW-40	2392.97	0.98	0.0026	0.67	243.6
Jan-22	2	MW-39	2394.41	MW-40	2393.50	0.91	0.0024	0.62	226.2
Jul-22	2	MW-39	2394.63	MW-40	2393.57	1.06	0.0028	0.72	263.5
Jan-23	2	MW-39	2394.71	MW-40	2393.70	1.01	0.0027	0.69	251.0
Jul-23	2	MW-39	2394.88	MW-40	2393.76	1.12	0.0030	0.76	278.4
Jan-24	2	MW-39	2394.74	MW-40	2393.54	1.20	0.0032	0.82	298.3
MAX			**2400.06**		**2396.47**	**4.27**	**0.01**	**2.11**	**770.5**
MIN			**2392.93**		**2392.01**	**0.68**	**0.00**	**0.46**	**169.0**
AVG			**2395.29**		**2393.75**	**1.54**	**0.00**	**0.93**	**339.6**
VAR			**7.13**		**4.46**	**3.59**	**0.01**	**1.65**	**601.5**

Table VI.B.2.e. - HISTORICAL AQUIFER FLOW CHARACTERISTICS

Alon USA, LP - Big Spring Refinery - Big Spring, Texas

UNIT = **SITE E LTU**

SATURATED ZONE = **LOWER (Basal Gravels - Ogallala Aquifer**

LINEAR DISTANCE = **(1) 801 feet, (2) 354 feet** *(see NOTE)*

HYDRAULIC CONDUCTIVITY = **991 gpm per sq. foot**

POROSITY = **30%**

Event	NOTE	UPGRADIENT Well	UPGRADIENT Water Level	DOWNGRADIENT Well	DOWNGRADIENT Water Level	Head Difference	FLOW GRADIENT	FLOW VELOCITY	
		na	feet-MSL	na	feet-MSL	feet	feet/foot	feet/day	feet/year
Oct-87	1	MW-38A	2399.96	MW-40A	2395.79	4.17	0.0052	2.30	839.4
Feb-88	1	MW-38A	2399.62	MW-40A	2395.68	3.94	0.0049	2.17	792.9
Jan-89	1	MW-38A	2399.60	MW-40A	2395.47	4.13	0.0052	2.28	831.1
Apr-89	1	MW-38A	2399.79	MW-40A	2395.29	4.50	0.0056	2.48	905.6
Jul-89	1	MW-38A	2399.56	MW-40A	2395.30	4.26	0.0053	2.35	857.3
Nov-89	1	MW-38A	2399.25	MW-40A	2395.02	4.23	0.0053	2.33	851.2
Jan-94	2	MW-39A	2397.97	MW-40A	2395.44	2.53	0.0071	3.16	1152.0
Mar-94	2	MW-39A	2397.82	MW-40A	2395.35	2.47	0.0070	3.08	1124.7
Jul-94	2	MW-39A	2397.70	MW-40A	2395.19	2.51	0.0071	3.13	1142.9
Oct-94	2	MW-39A	2397.76	MW-40A	2395.18	2.58	0.0073	3.22	1174.8
JAN-95	2	MW-39A	2397.47	MW-40A	2394.85	2.62	0.0074	3.27	1193.0
APR-95	2	MW-39A	2397.28	MW-40A	2394.65	2.63	0.0074	3.28	1197.6
OCT-95	2	MW-39A	2396.97	MW-40A	2394.33	2.64	0.0075	3.29	1202.1
JAN-96	2	MW-39A	2396.78	MW-40A	2394.10	2.68	0.0076	3.34	1220.3
JUL-96	2	MW-39A	2396.29	MW-40A	2393.58	2.71	0.0077	3.38	1234.0
JAN-97	2	MW-39A	2396.13	MW-40A	2393.24	2.89	0.0082	3.61	1315.9
JUL-97	2	MW-39A	2396.24	MW-40A	2393.52	2.72	0.0077	3.39	1238.5
JAN-98	2	MW-39A	2396.25	MW-40A	2393.69	2.56	0.0072	3.19	1165.7
JUL-98	2	MW-39A	2396.10	MW-40A	2393.49	2.61	0.0074	3.26	1188.4
JAN-99	2	MW-39A	2395.93	MW-40A	2393.22	2.71	0.0077	3.38	1234.0
JUL-99	2	MW-39A	2395.75	MW-40A	2393.07	2.68	0.0076	3.34	1220.3
JAN-00	2	MW-39A	2395.41	MW-40A	2393.06	2.35	0.0066	2.93	1070.1
APR-00	2	MW-39A	2395.13	MW-40A	2392.91	2.22	0.0063	2.77	1010.9
JUL-00	2	MW-39A	2395.10	MW-40A	2392.83	2.27	0.0064	2.83	1033.6
JAN-01	2	MW-39A	2394.79	MW-40A	2392.53	2.26	0.0064	2.82	1029.1
JUL-01	2	MW-39A	2394.75	MW-40A	2392.42	2.33	0.0066	2.91	1061.0
JAN-02	2	MW-39A	2395.02	MW-40A	2392.45	2.57	0.0073	3.21	1170.2
JUL-02	2	MW-39A	2394.57	MW-40A	2391.98	2.59	0.0073	3.23	1179.3
Jul-02	2	MW-39A	2394.57	MW-40A	2391.98	2.59	0.0073	3.23	1179.3
Jan-03	2	MW-39A	2394.42	MW-40A	2391.59	2.83	0.0080	3.53	1288.6
Jul-03	2	MW-39A	2394.14	MW-40A	2391.34	2.80	0.0079	3.49	1275.0
Jan-04	2	MW-39A	2393.88	MW-40A	2391.03	2.85	0.0081	3.56	1297.7
Jul-04	2	MW-39A	2393.71	MW-40A	2390.82	2.89	0.0082	3.61	1315.9
Jan-05	2	MW-39A	2394.71	MW-40A	2391.72	2.99	0.0084	3.73	1361.5
Jul-05	2	MW-39A	2396.07	MW-40A	2392.53	3.54	0.0100	4.42	1611.9
Jan-06	2	MW-39A	2394.88	MW-40A	2392.51	2.37	0.0067	2.96	1079.2
Jul-06	2	MW-39A	2394.82	MW-40A	2392.34	2.48	0.0070	3.09	1129.3
Jan-07	2	MW-39A	2394.69	MW-40A	2392.26	2.43	0.0069	3.03	1106.5
Jul-07	2	MW-39A	2395.05	MW-40A	2392.73	2.32	0.0066	2.89	1056.4
Jan-08	2	MW-39A	2395.49	MW-40A	2393.37	2.12	0.0060	2.64	965.3

Table VI.B.2.e. - HISTORICAL AQUIFER FLOW CHARACTERISTICS

Alon USA, LP - Big Spring Refinery - Big Spring, Texas

UNIT = **SITE E LTU**

SATURATED ZONE = **LOWER (Basal Gravels - Ogallala Aquifer**

LINEAR DISTANCE = **(1) 801 feet, (2) 354 feet** *(see NOTE)*

HYDRAULIC CONDUCTIVITY = **991 gpm per sq. foot**

POROSITY = **30%**

Event	NOTE	UPGRADIENT Well	UPGRADIENT Water Level	DOWNGRADIENT Well	DOWNGRADIENT Water Level	Head Difference	FLOW GRADIENT	FLOW VELOCITY	
		na	feet-MSL	na	feet-MSL	feet	feet/foot	feet/day	feet/year
Jul-08	2	MW-39A	2395.45	MW-40A	2393.43	2.02	0.0057	2.52	919.8
Jan-09	2	MW-39A	2395.01	MW-40A	2392.97	2.04	0.0058	2.54	928.9
Jul-09	2	MW-39A	2394.67	MW-40A	2392.37	2.30	0.0065	2.87	1047.3
Jan-10	2	MW-39A	2394.10	MW-40A	2391.84	2.26	0.0064	2.82	1029.1
Jul-10	2	MW-39A	2394.55	MW-40A	2392.19	2.36	0.0067	2.94	1074.6
Jan-11	2	MW-39A	2394.85	MW-40A	2393.31	1.54	0.0044	1.92	701.2
Jul-11	2	MW-39A	2394.73	MW-40A	2392.87	1.86	0.0053	2.32	846.9
Jan-12	2	MW-39A	2393.03	MW-40A	2391.03	2.00	0.0056	2.50	910.7
Jul-12	2	MW-39A	2393.73	MW-40A	2391.52	2.21	0.0062	2.76	1006.3
Jan-13	2	MW-39A	2393.50	MW-40A	2391.79	1.71	0.0048	2.13	778.6
Jul-13	2	MW-39A	2393.30	MW-40A	2391.42	1.88	0.0053	2.35	856.0
Jan-14	2	MW-39A	2392.98	MW-40A	2391.24	1.74	0.0049	2.17	792.3
Mar-15	2	MW-39A	2392.97	MW-40A	2391.36	1.61	0.0045	2.01	733.1
Jul-15	2	MW-39A	2392.97	MW-40A	2391.50	1.47	0.0042	1.83	669.4
Jan-16	2	MW-39A	2393.21	MW-40A	2391.81	1.40	0.0040	1.75	637.5
Jul-16	2	MW-39A	2393.46	MW-40A	2392.07	1.39	0.0039	1.73	632.9
Jan-17	2	MW-39A	2393.90	MW-40A	2392.60	1.30	0.0037	1.62	591.9
Jul-17	2	MW-39A	2393.89	MW-40A	2392.46	1.43	0.0040	1.78	651.1
Jan-18	2	MW-39A	2393.51	MW-40A	2391.86	1.65	0.0047	2.06	751.3
Jul-18	2	MW-39A	2393.41	MW-40A	2391.66	1.75	0.0049	2.18	796.9
Jan-19	2	MW-39A	2393.37	MW-40A	2391.38	1.99	0.0056	2.48	906.1
Jul-19	2	MW-39A	2393.58	MW-40A	2391.80	1.78	0.0050	2.22	810.5
Jan-20	2	MW-39A	2393.55	MW-40A	2391.81	1.74	0.0049	2.17	792.3
Jul-20	2	MW-39A	2393.71	MW-40A	2392.00	1.71	0.0048	2.13	778.6
Jan-21	2	MW-39A	2393.87	MW-40A	2392.21	1.66	0.0047	2.07	755.9
Jul-21	2	MW-39A	2394.26	MW-40A	2392.37	1.89	0.0053	2.36	860.6
Jan-22	2	MW-39A	2394.42	MW-40A	2392.93	1.49	0.0042	1.86	678.5
Jul-22	2	MW-39A	2394.62	MW-40A	2393.03	1.59	0.0045	1.98	724.0
Jan-23	2	MW-39A	2394.70	MW-40A	2393.18	1.52	0.0043	1.90	692.1
Jul-23	2	MW-39A	2394.85	MW-40A	2393.23	1.62	0.0046	2.02	737.7
Jan-24	2	MW-39A	2394.69	MW-40A	2392.98	1.71	0.0048	2.13	778.6
MAX			**2399.96**		**2395.79**	**4.50**	**0.01**	**4.42**	**1611.9**
MIN			**2392.97**		**2390.82**	**1.30**	**0.00**	**1.62**	**591.9**
AVG			**2395.27**		**2392.90**	**2.37**	**0.01**	**2.71**	**988.4**
VAR			**6.99**		**4.97**	**3.20**	**0.01**	**2.79**	**1020.0**

Table VI.B.2.e. - HISTORICAL AQUIFER FLOW CHARACTERISTICS

Alon USA, LP - Big Spring Refinery - Big Spring, Texas

UNIT = **BICA**

SATURATED ZONE = **UPPER (Saturated Sands of Ogallala Aquifer)**

LINEAR DISTANCE = **6,198 feet**

HYDRAULIC CONDUCTIVITY = **300 gpm per sq. foot**

POROSITY = **27%**

NOTE / Event	UPGRADIENT Well na	UPGRADIENT Water Level feet-MSL	DOWNGRADIENT Well na	DOWNGRADIENT Water Level feet-MSL	Head Difference feet	FLOW GRADIENT feet/foot	FLOW VELOCITY feet/day	FLOW VELOCITY feet/year
Jan-94	MW-40	2396.34	MW-109	2362.80	33.54	0.0054	0.80	293.4
Mar-94	MW-40	2396.30	MW-109	2362.77	33.53	0.0054	0.80	293.3
Jul-94	MW-40	2396.14	MW-109	2362.16	33.98	0.0055	0.81	297.2
Oct-94	MW-40	2396.18	MW-109	2361.55	34.63	0.0056	0.83	302.9
JAN-95	MW-40	2395.89	MW-109	2362.09	33.80	0.0055	0.81	295.7
APR-95	MW-40	2395.72	MW-109	2362.51	33.21	0.0054	0.80	290.5
JUL-95	MW-40	2395.48	MW-109	2361.72	33.76	0.0054	0.81	295.3
OCT-95	MW-40	2395.39	MW-109	2361.93	33.46	0.0054	0.80	292.7
JAN-96	MW-40	2395.16	MW-109	2362.26	32.90	0.0053	0.79	287.8
JUL-96	MW-40	2394.64	MW-109	2361.95	32.69	0.0053	0.78	286.0
JAN-97	MW-40	2394.44	MW-109	2362.77	31.67	0.0051	0.76	277.0
JUL-97	MW-40	2394.58	MW-109	2361.77	32.81	0.0053	0.79	287.0
JAN-98	MW-40	2394.68	MW-109	2361.30	33.38	0.0054	0.80	292.0
JAN-99	MW-40	2394.19	MW-109	2362.06	32.13	0.0052	0.77	281.1
JUL-99	MW-40	2394.01	MW-109	2360.62	33.39	0.0054	0.80	292.1
JAN-00	MW-40	2393.74	MW-109	2361.59	32.15	0.0052	0.77	281.2
JUL-00	MW-40	2393.48	MW-109	2359.85	33.63	0.0054	0.81	294.2
JAN-01	MW-40	2393.17	MW-109	2361.22	31.95	0.0052	0.77	279.5
JUL-01	MW-40	2393.01	MW-109	2360.27	32.74	0.0053	0.78	286.4
JAN-02	MW-40	2393.12	MW-109	2361.74	31.38	0.0051	0.75	274.5
JUL-02	MW-40	2392.89	MW-109	2360.75	32.14	0.0052	0.77	281.2
Jul-02	MW-40	2392.89	MW-109	2360.75	32.14	0.0052	0.77	281.2
Jan-03	MW-40	2392.65	MW-109	2361.66	30.99	0.0050	0.74	271.1
Jul-03	MW-40	2392.46	MW-109	2361.27	31.19	0.0050	0.75	272.8
Jan-04	MW-40	2392.18	MW-109	2361.59	30.59	0.0049	0.73	267.6
Jul-04	MW-40	2392.01	MW-109	2360.92	31.09	0.0050	0.75	272.0
Jan-05	MW-40	2392.89	MW-109	2362.73	30.16	0.0049	0.72	263.8
Jul-05	MW-40	2393.82	MW-109	2362.34	31.48	0.0051	0.75	275.4
Jan-06	MW-40	2393.61	MW-109	2362.66	30.95	0.0050	0.74	270.7
Jul-06	MW-40	2393.48	MW-109	2362.15	31.33	0.0051	0.75	274.1
Jan-07	MW-40	2393.35	MW-109	2362.76	30.59	0.0049	0.73	267.6
Jul-07	MW-40	2393.73	MW-109	2362.71	31.02	0.0050	0.74	271.4
Jan-08	MW-40	2394.36	MW-109	2363.55	30.81	0.0050	0.74	269.5
Jul-08	MW-40	2394.39	MW-109	2362.65	31.74	0.0051	0.76	277.7
Jan-09	MW-40	2393.98	MW-109	2363.46	30.52	0.0049	0.73	267.0
Jul-09	MW-40	2393.39	MW-109	2362.80	30.59	0.0049	0.73	267.6
Jan-10	MW-40	2392.88	MW-109	2363.44	29.44	0.0047	0.71	257.5
Jul-10	MW-40	2393.24	MW-109	2363.20	30.04	0.0048	0.72	262.8
Jan-11	MW-40	2393.55	MW-109	2363.51	30.04	0.0048	0.72	262.8
Jul-11	MW-40	2393.78	MW-109	2362.99	30.79	0.0050	0.74	269.3

Table VI.B.2.e. - HISTORICAL AQUIFER FLOW CHARACTERISTICS

Alon USA, LP - Big Spring Refinery - Big Spring, Texas

UNIT = **BICA**

SATURATED ZONE = **UPPER (Saturated Sands of Ogallala Aquifer)**

LINEAR DISTANCE = **6,198 feet**

HYDRAULIC CONDUCTIVITY = **300 gpm per sq. foot**

POROSITY = **27%**

NOTE / Event	UPGRADIENT Well	UPGRADIENT Water Level	DOWNGRADIENT Well	DOWNGRADIENT Water Level	Head Difference	FLOW GRADIENT	FLOW VELOCITY	
	na	feet-MSL	na	feet-MSL	feet	feet/foot	feet/day	feet/year
Jan-12	MW-40	2392.87	MW-109	2363.75	29.12	0.0047	0.70	254.7
Jul-12	MW-40	2392.56	MW-109	2362.88	29.68	0.0048	0.71	259.6
Jan-13	MW-40	2392.55	MW-109	2363.91	28.64	0.0046	0.69	250.5
Jul-13	MW-40	2392.26	MW-109	2363.19	29.07	0.0047	0.70	254.3
Jan-14	MW-40	2392.04	MW-109	2363.47	28.57	0.0046	0.68	249.9
Mar-15	MW-40	2392.04	MW-109	2363.94	28.10	0.0045	0.67	245.8
Jul-15	MW-40	2392.13	MW-109	2363.43	28.70	0.0046	0.69	251.1
Jan-16	MW-40	2392.43	MW-109	2364.10	28.33	0.0046	0.68	247.8
Jul-16	MW-40	2392.65	MW-109	2363.70	28.95	0.0047	0.69	253.2
Jan-17	MW-40	2393.15	MW-109	2364.03	29.12	0.0047	0.70	254.7
Jul-17	MW-40	2393.11	MW-109	2362.64	30.47	0.0049	0.73	266.5
Jan-18	MW-40	2392.84	MW-109	2363.56	29.28	0.0047	0.70	256.1
Jul-18	MW-40	2392.53	MW-109	2362.69	29.84	0.0048	0.72	261.0
Jan-19	MW-40	2392.10	MW-109	2363.61	28.49	0.0046	0.68	249.2
Jul-19	MW-40	2392.26	MW-109	2363.16	29.10	0.0047	0.70	254.6
Jan-20	MW-40	2392.48	MW-109	2363.82	28.66	0.0046	0.69	250.7
Jul-20	MW-40	2392.56	MW-109	2363.79	28.77	0.0046	0.69	251.7
Jan-21	MW-40	2392.79	MW-109	2364.06	28.73	0.0046	0.69	251.3
Jul-21	MW-40	2392.97	MW-109	2364.34	28.63	0.0046	0.69	250.4
Jan-22	MW-40	2393.50	MW-109	2364.11	29.39	0.0047	0.70	257.1
Jul-22	MW-40	2393.57	MW-109	2363.26	30.31	0.0049	0.73	265.1
Jan-23	MW-40	2393.70	MW-109	2364.20	29.50	0.0048	0.71	258.1
Jul-23	MW-40	2393.76	MW-109	2363.20	30.56	0.0049	0.73	267.3
Jan-24	MW-40	2393.54	MW-109	2364.06	29.48	0.0048	0.71	257.9
MAX		**2396.34**		**2364.34**	**34.63**	**0.0056**	**0.83**	**302.94**
MIN		**2392.01**		**2359.85**	**28.10**	**0.0045**	**0.67**	**245.81**
AVG		**2393.56**		**2362.65**	**30.90**	**0.0050**	**0.74**	**270.34**
VAR		**4.33**		**4.49**	**6.53**	**0.0011**	**0.16**	**57.12**

Table VI.B.2.e. - HISTORICAL AQUIFER FLOW CHARACTERISTICS

Alon USA, LP - Big Spring Refinery - Big Spring, Texas

UNIT = **BICA**
SATURATED ZONE = **LOWER (Basal Gravels - Ogallala Aquifer**
LINEAR DISTANCE = **6182 feet**
HYDRAULIC CONDUCTIVITY = **1,200 gpm per sq. foot**
POROSITY = **30%**

NOTE	UPGRADIENT		DOWNGRADIENT		Head	FLOW	FLOW VELOCITY	
Event	Well	Water Level	Well	Water Level	Difference	GRADIENT		
	na	feet-MSL	na	feet-MSL	feet	feet/foot	feet/day	feet/year
Jan-94	MW-40A	2395.44	MW-109A	2362.90	32.54	0.0053	2.81	1027.4
Mar-94	MW-40A	2395.35	MW-109A	2362.86	32.49	0.0053	2.81	1025.8
Jul-94	MW-40A	2395.19	MW-109A	2362.22	32.97	0.0053	2.85	1041.0
Oct-94	MW-40A	2395.18	MW-109A	2361.65	33.53	0.0054	2.90	1058.7
JAN-95	MW-40A	2394.85	MW-109A	2362.19	32.66	0.0053	2.83	1031.2
APR-95	MW-40A	2394.65	MW-109A	2362.59	32.06	0.0052	2.77	1012.2
JUL-95	MW-40A	2394.42	MW-109A	2361.84	32.58	0.0053	2.82	1028.7
OCT-95	MW-40A	2394.33	MW-109A	2361.98	32.35	0.0052	2.80	1021.4
JAN-96	MW-40A	2394.10	MW-109A	2362.33	31.77	0.0051	2.75	1003.1
JUL-96	MW-40A	2393.58	MW-109A	2362.06	31.52	0.0051	2.73	995.2
JAN-97	MW-40A	2393.24	MW-109A	2362.86	30.38	0.0049	2.63	959.2
JUL-97	MW-40A	2393.52	MW-109A	2361.88	31.64	0.0051	2.74	999.0
JAN-98	MW-40A	2393.69	MW-109A	2361.38	32.31	0.0052	2.79	1020.1
JAN-99	MW-40A	2393.22	MW-109A	2362.17	31.05	0.0050	2.69	980.4
JUL-99	MW-40A	2393.07	MW-109A	2360.68	32.39	0.0052	2.80	1022.7
JAN-00	MW-40A	2393.06	MW-109A	2361.69	31.37	0.0051	2.71	990.5
JUL-00	MW-40A	2392.83	MW-109A	2359.96	32.87	0.0053	2.84	1037.8
JAN-01	MW-40A	2392.53	MW-109A	2361.32	31.21	0.0050	2.70	985.4
JUL-01	MW-40A	2392.42	MW-109A	2360.40	32.02	0.0052	2.77	1011.0
JAN-02	MW-40A	2392.45	MW-109A	2361.83	30.62	0.0050	2.65	966.8
JUL-02	MW-40A	2391.98	MW-109A	2360.87	31.11	0.0050	2.69	982.3
Jul-02	MW-40A	2391.98	MW-109A	2360.87	31.11	0.0050	2.69	982.3
Jan-03	MW-40A	2391.59	MW-109A	2361.77	29.82	0.0048	2.58	941.5
Jul-03	MW-40A	2391.34	MW-109A	2361.41	29.93	0.0048	2.59	945.0
Jan-04	MW-40A	2391.03	MW-109A	2361.71	29.32	0.0047	2.54	925.7
Jul-04	MW-40A	2390.82	MW-109A	2361.06	29.76	0.0048	2.57	939.6
Jan-05	MW-40A	2391.72	MW-109A	2362.90	28.82	0.0047	2.49	909.9
Jul-05	MW-40A	2392.53	MW-109A	2362.44	30.09	0.0049	2.60	950.0
Jan-06	MW-40A	2392.51	MW-109A	2362.81	29.70	0.0048	2.57	937.7
Jul-06	MW-40A	2392.34	MW-109A	2362.30	30.04	0.0049	2.60	948.5
Jan-07	MW-40A	2392.26	MW-109A	2362.90	29.36	0.0047	2.54	927.0
Jul-07	MW-40A	2392.73	MW-109A	2362.88	29.85	0.0048	2.58	942.5
Jan-08	MW-40A	2393.37	MW-109A	2363.72	29.65	0.0048	2.56	936.2
Jul-08	MW-40A	2393.43	MW-109A	2362.83	30.60	0.0049	2.65	966.1
Jan-09	MW-40A	2392.97	MW-109A	2363.63	29.34	0.0047	2.54	926.4
Jul-09	MW-40A	2392.37	MW-109A	2362.99	29.38	0.0048	2.54	927.6
Jan-10	MW-40A	2391.84	MW-109A	2363.61	28.23	0.0046	2.44	891.3
Jul-10	MW-40A	2392.19	MW-109A	2363.43	28.76	0.0047	2.49	908.1
Jan-11	MW-40A	2393.31	MW-109A	2363.48	29.83	0.0048	2.58	941.8
Jul-11	MW-40A	2392.87	MW-109A	2363.14	29.73	0.0048	2.57	938.7

Table VI.B.2.e. - HISTORICAL AQUIFER FLOW CHARACTERISTICS

Alon USA, LP - Big Spring Refinery - Big Spring, Texas

UNIT = **BICA**
SATURATED ZONE = **LOWER (Basal Gravels - Ogallala Aquifer**
LINEAR DISTANCE = **6182 feet**
HYDRAULIC CONDUCTIVITY = **1,200 gpm per sq. foot**
POROSITY = **30%**

NOTE / Event	UPGRADIENT Well	UPGRADIENT Water Level	DOWNGRADIENT Well	DOWNGRADIENT Water Level	Head Difference	FLOW GRADIENT	FLOW VELOCITY	
	na	feet-MSL	na	feet-MSL	feet	feet/foot	feet/day	feet/year
Jan-12	MW-40A	2391.99	MW-109A	2364.02	27.97	0.0045	2.42	883.1
Jul-12	MW-40A	2391.52	MW-109A	2363.06	28.46	0.0046	2.46	898.6
Jan-13	MW-40A	2391.79	MW-109A	2364.11	27.68	0.0045	2.39	874.0
Jul-13	MW-40A	2391.42	MW-109A	2363.43	27.99	0.0045	2.42	883.7
Jan-14	MW-40A	2391.24	MW-109A	2363.67	27.57	0.0045	2.38	870.5
Mar-15	MW-40A	2391.36	MW-109A	2364.13	27.23	0.0044	2.36	859.7
Jul-15	MW-40A	2391.50	MW-109A	2362.63	28.87	0.0047	2.50	911.5
Jan-16	MW-40A	2391.81	MW-109A	2364.26	27.55	0.0045	2.38	869.8
Jul-16	MW-40A	2392.07	MW-109A	2363.86	28.21	0.0046	2.44	890.7
Jan-17	MW-40A	2392.60	MW-109A	2364.22	28.38	0.0046	2.45	896.1
Jul-17	MW-40A	2392.46	MW-109A	2362.85	29.61	0.0048	2.56	934.9
Jan-18	MW-40A	2392.18	MW-109A	2363.75	28.43	0.0046	2.46	897.6
Jul-18	MW-40A	2391.86	MW-109A	2362.82	29.04	0.0047	2.51	916.9
Jan-19	MW-40A	2391.38	MW-109A	2363.77	27.61	0.0045	2.39	871.7
Jul-19	MW-40A	2391.80	MW-109A	2363.35	28.45	0.0046	2.46	898.3
Jan-20	MW-40A	2391.81	MW-109A	2364.02	27.79	0.0045	2.40	877.4
Jul-20	MW-40A	2392.00	MW-109A	2363.93	28.07	0.0045	2.43	886.3
Jan-21	MW-40A	2392.21	MW-109A	2364.23	27.98	0.0045	2.42	883.4
Jul-21	MW-40A	2392.37	MW-109A	2363.51	28.86	0.0047	2.50	911.2
Jan-22	MW-40A	2392.93	MW-109A	2364.32	28.61	0.0046	2.47	903.3
Jul-22	MW-40A	2393.03	MW-109A	2363.47	29.56	0.0048	2.56	933.3
Jan-23	MW-40A	2393.18	MW-109A	2364.39	28.79	0.0047	2.49	909.0
Jul-23	MW-40A	2393.23	MW-109A	2363.40	29.83	0.0048	2.58	941.8
Jan-24	MW-40A	2392.98	MW-109A	2364.24	28.74	0.0046	2.49	907.4
MAX		**2395.44**		**2364.39**	**33.53**	**0.0054**	**2.90**	**1058.66**
MIN		**2390.82**		**2359.96**	**27.23**	**0.0044**	**2.36**	**859.75**
AVG		**2392.70**		**2362.77**	**29.94**	**0.0048**	**2.59**	**945.25**
VAR		**4.62**		**4.43**	**6.30**	**0.0010**	**0.54**	**198.91**

Table VI.B.2.e. - HISTORICAL AQUIFER FLOW CHARACTERISTICS

Alon USA, LP - Big Spring Refinery - Big Spring, Texas

UNIT = **SITE H LTU**

SATURATED ZONE = **UPPER (Saturated Sands of Ogallala Aquifer)**

LINEAR DISTANCE = **(1) 976 feet, (2) 1,086 feet** *(see NOTE)*

HYDRAULIC CONDUCTIVITY = **300 gpm per sq. foot**

POROSITY = **27%**

Event	NOTE	UPGRADIENT Well	UPGRADIENT Water Level	DOWNGRADIENT Well	DOWNGRADIENT Water Level	Head Difference	FLOW GRADIENT	FLOW VELOCITY	
		na	feet-MSL	na	feet-MSL	feet	feet/foot	feet/day	feet/year
Oct-92	1	MW-76	2408.72	MW-75	2407.40	1.32	0.0014	0.10	37.2
Apr-93	1	MW-76	2408.60	MW-75	2407.34	1.26	0.0013	0.10	35.5
Oct-93	1	MW-76	2409.39	MW-75	2406.98	2.41	0.0025	0.19	67.8
Jan-94	1	MW-76	2409.46	MW-75	2408.16	1.30	0.0013	0.10	36.6
Mar-94	1	MW-76	2409.75	MW-75	2407.92	1.83	0.0019	0.14	51.5
Jan-97	1	MW-76	2409.40	MW-75	2406.51	2.89	0.0030	0.22	81.3
Jul-97	1	MW-76	2409.89	MW-75	2406.34	3.55	0.0036	0.27	99.9
Jan-98	1	MW-76	2409.68	MW-75	2406.63	3.05	0.0031	0.24	85.8
Jul-98	1	MW-76	2409.51	MW-75	2406.33	3.18	0.0033	0.25	89.5
Jan-99	1	MW-76	2409.27	MW-75	2406.04	3.23	0.0033	0.25	90.9
Jul-99	1	MW-76	2409.26	MW-75	2405.98	3.28	0.0034	0.25	92.3
Jan-00	1	MW-76	2409.51	MW-75	2406.31	3.20	0.0033	0.25	90.1
Jul-00	1	MW-76	2409.03	MW-75	2405.59	3.44	0.0035	0.27	96.8
Jan-01	1	MW-76	2408.78	MW-75	2405.23	3.55	0.0036	0.27	99.9
Jul-01	1	MW-76	2408.60	MW-75	2404.97	3.63	0.0037	0.28	102.2
Jan-02	1	MW-76	2408.42	MW-75	2404.72	3.70	0.0038	0.29	104.1
Jul-02	1	MW-76	2408.30	MW-75	2404.45	3.85	0.0039	0.30	108.4
Jan-03	1	MW-76	2408.13	MW-75	2404.36	3.77	0.0039	0.29	106.1
Jul-03	1	MW-76	2407.98	MW-75	2403.98	4.00	0.0041	0.31	112.6
Jul-04	1	MW-76	2407.91	MW-75	2404.09	3.82	0.0039	0.29	107.5
Jul-05	1	MW-76	2409.20	MW-75	2405.70	3.50	0.0036	0.27	98.5
Jul-06	1	MW-76	2408.67	MW-75	2404.53	4.14	0.0042	0.32	116.5
Jul-07	1	MW-76	2407.84	MW-75	2403.38	4.46	0.0046	0.34	125.5
Jul-08	1	MW-76	2408.01	MW-75	2403.56	4.45	0.0046	0.34	125.3
Jul-09	1	MW-76	2407.10	MW-75	2402.25	4.85	0.0050	0.37	136.5
Jul-10	2	MW-76	2406.98	MW-54	2401.40	5.58	0.0051	0.39	141.1
Jul-11	2	MW-76	2407.19	MW-54	2401.90	5.29	0.0049	0.37	133.8
Jul-12	2	MW-52	2404.46	MW-54	2401.36	3.10	0.0029	0.21	78.4
Jul-13	2	MW-76	2406.86	MW-54	2401.56	5.30	0.0049	0.37	134.1
Jul-14	2	MW-76	2405.06	MW-54	2401.93	3.13	0.0029	0.22	79.2
Jul-15	2	MW-52	2405.55	MW-54	2402.55	3.00	0.0028	0.21	75.9
Jul-16	2	MW-76	2407.86	MW-54	2403.77	4.09	0.0038	0.28	103.5
Jul-17	2	MW-76	2408.30	MW-54	2403.94	4.36	0.0040	0.30	110.3
Jul-18	2	MW-76	2408.39	MW-54	2403.99	4.40	0.0041	0.30	111.3
Jul-19	2	MW-76	2408.57	MW-54	2404.33	4.24	0.0039	0.29	107.3
Jul-20	2	MW-76	2408.62	MW-54	2404.59	4.03	0.0037	0.28	101.9
Jul-21	2	MW-76	2408.37	MW-54	2404.24	4.13	0.0038	0.29	104.5
Jul-22	2	MW-76	2407.60	MW-54	2404.56	3.04	0.0028	0.21	76.9
Jul-23	2	MW-76	2406.97	MW-54	2404.55	2.42	0.0022	0.17	61.2
Jan-24	2	MW-76	2406.39	MW-54	2404.03	2.36	0.0022	0.16	59.7

Table VI.B.2.e. - HISTORICAL AQUIFER FLOW CHARACTERISTICS

Alon USA, LP - Big Spring Refinery - Big Spring, Texas

UNIT = **SITE H LTU**

SATURATED ZONE = **UPPER (Saturated Sands of Ogallala Aquifer)**

LINEAR DISTANCE = **(1) 976 feet, (2) 1,086 feet** *(see NOTE)*

HYDRAULIC CONDUCTIVITY = **300 gpm per sq. foot**

POROSITY = **27%**

NOTE / Event	UPGRADIENT Well na	UPGRADIENT Water Level feet-MSL	DOWNGRADIENT Well na	DOWNGRADIENT Water Level feet-MSL	Head Difference feet	FLOW GRADIENT feet/foot	FLOW VELOCITY feet/day	FLOW VELOCITY feet/year
MAX		2409.89		2408.16	5.58	0.0051	0.39	141.15
MIN		2404.46		2401.36	1.26	0.0013	0.10	35.46
AVG		2408.19		2404.69	3.50	0.0034	0.26	94.44
VAR		5.43		6.80	4.32	0.0038	0.29	105.68

Table VI.B.2.e. - HISTORICAL AQUIFER FLOW CHARACTERISTICS

Alon USA, LP - Big Spring Refinery - Big Spring, Texas

UNIT = **SITE H LTU**

SATURATED ZONE = **LOWER (Basal Gravels - Ogallala Aquifer**

LINEAR DISTANCE = **(1) 965 feet, (2) 1,076 feet** *(see NOTE)*

HYDRAULIC CONDUCTIVITY = **1,200 gpm per sq. foot**

POROSITY = **30%**

		UPGRADIENT		DOWNGRADIENT		Head	FLOW	FLOW VELOCITY	
Event	NOTE	Well na	Water Level feet-MSL	Well na	Water Level feet-MSL	Difference feet	GRADIENT feet/foot	feet/day	feet/year
Oct-92	1	MW-76A	2408.31	MW-75A	2407.38	0.93	0.0010	0.09	33.5
Apr-93	1	MW-76A	2408.33	MW-75A	2407.49	0.84	0.0009	0.08	30.3
Oct-93	1	MW-76A	2409.35	MW-75A	2406.94	2.41	0.0025	0.24	86.9
Jan-94	1	MW-76A	2409.44	MW-75A	2407.87	1.57	0.0016	0.16	56.6
Mar-94	1	MW-76A	2409.54	MW-75A	2407.97	1.57	0.0016	0.16	56.6
Jan-97	1	MW-76A	2409.37	MW-75A	2405.17	4.20	0.0044	0.42	151.5
Jul-97	1	MW-76A	2409.37	MW-75A	2405.75	3.62	0.0038	0.36	130.6
Jan-98	1	MW-76A	2409.66	MW-75A	2406.09	3.57	0.0037	0.35	128.8
Jul-98	1	MW-76A	2409.48	MW-75A	2405.45	4.03	0.0042	0.40	145.4
Jan-99	1	MW-76A	2409.26	MW-75A	2405.30	3.96	0.0041	0.39	142.8
Jul-99	1	MW-76A	2409.26	MW-75A	2405.71	3.55	0.0037	0.35	128.1
Jan-00	1	MW-76A	2409.51	MW-75A	2405.54	3.97	0.0041	0.39	143.2
Jul-00	1	MW-76A	2409.01	MW-75A	2404.65	4.36	0.0045	0.43	157.3
Jan-01	1	MW-76A	2408.76	MW-75A	2404.24	4.52	0.0047	0.45	163.0
Jul-01	1	MW-76A	2408.58	MW-75A	2404.52	4.06	0.0042	0.40	146.4
Jan-02	1	MW-76A	2408.42	MW-75A	2403.72	4.70	0.0049	0.46	169.5
Jul-02	1	MW-76A	2408.28	MW-75A	2403.48	4.80	0.0050	0.47	173.1
Jan-03	1	MW-76A	2408.11	MW-75A	2403.15	4.96	0.0051	0.49	178.9
Jul-03	1	MW-76A	2407.98	MW-75A	2402.80	5.18	0.0054	0.51	186.8
Jul-04	1	MW-76A	2407.91	MW-75A	2403.75	4.16	0.0043	0.41	150.1
Jul-05	1	MW-76A	2409.13	MW-75A	2406.93	2.20	0.0023	0.22	79.4
Jul-06	1	MW-76A	2408.67	MW-75A	2404.46	4.21	0.0044	0.42	151.9
Jul-07	1	MW-76A	2407.85	MW-75A	2403.60	4.25	0.0044	0.42	153.3
Jul-08	1	MW-76A	2408.01	MW-75A	2402.61	5.40	0.0056	0.53	194.8
Jul-09	1	MW-76A	2407.06	MW-75A	2400.80	6.26	0.0065	0.62	225.8
Jul-10	1	MW-76A	2406.82	MW-75A	2401.07	5.75	0.0060	0.57	207.4
Jul-11	1	MW-76A	2407.06	MW-75A	2401.37	5.69	0.0059	0.56	205.2
Jul-12	1	MW-76A	2406.59	MW-75A	2400.76	5.83	0.0060	0.58	210.3
Jul-13	2	MW-76A	2406.86	MW-54A	2402.23	4.63	0.0043	0.41	149.8
Jul-14	1	MW-76A	2406.69	MW-75A	2402.28	4.41	0.0046	0.44	159.1
Jul-15	1	MW-76A	2407.24	MW-75A	2402.91	4.33	0.0045	0.43	156.2
Jul-16	2	MW-76A	2407.83	MW-54A	2403.42	4.41	0.0041	0.39	142.7
Jul-17	1	MW-76A	2408.25	MW-75A	2404.11	4.14	0.0043	0.41	149.3
Jul-18	2	MW-76A	2408.39	MW-54A	2403.99	4.40	0.0041	0.39	142.3
Jul-19	2	MW-76A	2408.56	MW-54A	2404.32	4.24	0.0039	0.38	137.2
Jul-20	2	MW-76A	2408.30	MW-54A	2404.27	4.03	0.0037	0.36	130.4
Jul-21	2	MW-76A	2408.33	MW-54A	2404.21	4.12	0.0038	0.37	133.3
Jul-22	2	MW-76A	2407.58	MW-54A	2404.48	3.10	0.0029	0.27	100.3
Jul-23	2	MW-76A	2406.91	MW-54A	2404.52	2.39	0.0022	0.21	77.3
Jan-24	2	MW-76A	2406.38	MW-54A	2403.99	2.39	0.0022	0.21	77.3

Table VI.B.2.e. - HISTORICAL AQUIFER FLOW CHARACTERISTICS

Alon USA, LP - Big Spring Refinery - Big Spring, Texas

UNIT = **SITE H LTU**

SATURATED ZONE = **LOWER (Basal Gravels - Ogallala Aquifer**

LINEAR DISTANCE = **(1) 965 feet, (2) 1,076 feet** *(see NOTE)*

HYDRAULIC CONDUCTIVITY = **1,200 gpm per sq. foot**

POROSITY = **30%**

Event	NOTE	UPGRADIENT Well na	UPGRADIENT Water Level feet-MSL	DOWNGRADIENT Well na	DOWNGRADIENT Water Level feet-MSL	Head Difference feet	FLOW GRADIENT feet/foot	FLOW VELOCITY feet/day	FLOW VELOCITY feet/year
MAX			2409.66		2407.97	6.26	0.0065	0.62	225.80
MIN			2406.38		2400.76	0.84	0.0009	0.08	30.30
AVG			2408.26		2404.33	3.93	0.0040	0.38	138.57
VAR			3.28		7.21	5.42	0.0056	0.54	195.50

Table VI.B.2.e. - HISTORICAL AQUIFER FLOW CHARACTERISTICS

Alon USA, LP - Big Spring Refinery - Big Spring, Texas

UNIT = **FACILITY-WIDE**

SATURATED ZONE = **UPPER (Saturated Sands of Ogallala Aquifer)**

LINEAR DISTANCE = **(1) 10,480 feet, (2) 10,237 feet, (3) 9,378 feet** *(see NOTE)*

HYDRAULIC CONDUCTIVITY = **1,200 gpm per sq. foot**

POROSITY = **30%**

Event	NOTE	UPGRADIENT Well	UPGRADIENT Water Level	DOWNGRADIENT Well	DOWNGRADIENT Water Level	Head Difference	FLOW GRADIENT	FLOW VELOCITY	
		na	feet-MSL	na	feet-MSL	feet	feet/foot	feet/day	feet/year
Oct-92	1	MW-76	2408.32	MW-79	2368.41	39.91	0.0039	0.62	228.1
Mar-93	1	MW-76	2408.41	MW-79	2368.35	40.06	0.0039	0.63	228.9
Oct-93	1	MW-76	2400.11	MW-79	2368.13	31.98	0.0032	0.50	182.8
Mar-94	1	MW-76	2409.75	MW-79	2368.44	41.31	0.0041	0.65	236.1
Apr-95	1	MW-76	2399.45	MW-79	2366.45	33.00	0.0033	0.52	188.6
Oct-95	1	MW-76	2409.60	MW-79	2365.67	43.93	0.0043	0.69	251.0
Jan-96	1	MW-76	2409.88	MW-79	2366.76	43.12	0.0042	0.68	246.4
Jul-96	1	MW-76	2409.83	MW-79	2356.84	52.99	0.0052	0.83	302.8
Jan-97	1	MW-76	2409.40	MW-79	2367.22	42.18	0.0042	0.66	241.0
Jul-97	1	MW-76	2409.89	MW-79	2367.53	42.36	0.0042	0.66	242.1
Jan-98	2	MW-76	2409.68	MW-78	2363.59	46.09	0.0045	0.72	261.0
Jul-98	2	MW-76	2409.51	MW-78	2371.99	37.52	0.0037	0.58	212.5
Jan-99	2	MW-76	2409.27	MW-78	2372.91	36.36	0.0036	0.56	205.9
Jul-99	2	MW-76	2409.26	MW-78	2364.80	44.46	0.0043	0.69	251.8
Jan-00	2	MW-76	2409.51	MW-78	2361.54	47.97	0.0047	0.74	271.7
Jul-00	3	MW-76	2409.03	IW-58	2372.89	36.14	0.0039	0.61	223.4
Jan-01	3	MW-76	2408.78	IW-58	2372.91	35.87	0.0038	0.61	221.8
Jul-01	3	MW-76	2408.60	IW-58	2372.84	35.76	0.0038	0.61	221.1
Jan-02	3	MW-76	2408.42	IW-58	2374.42	34.00	0.0036	0.58	210.2
Jul-02	3	MW-76	2408.30	IW-58	2374.11	34.19	0.0036	0.58	211.4
Jan-03	3	MW-76	2408.13	IW-58	2373.21	34.92	0.0037	0.59	215.9
Jul-03	3	MW-76	2407.98	IW-58	2373.31	34.67	0.0037	0.59	214.3
Jan-04	3	MW-76	2407.87	IW-58	2373.44	34.43	0.0037	0.58	212.9
Jul-04	3	MW-76	2407.91	IW-58	2373.92	33.99	0.0036	0.58	210.1
Jan-05	3	MW-76	2408.35	IW-58	2377.67	30.68	0.0033	0.52	189.7
Jul-05	3	MW-76	2409.20	IW-58	2377.32	31.88	0.0034	0.54	197.1
Jan-06	3	MW-76	2409.09	IW-58	2376.85	32.24	0.0034	0.55	199.3
Jul-06	3	MW-76	2408.67	IW-58	2376.79	31.88	0.0034	0.54	197.1
Jan-07	3	MW-76	2408.20	IW-58	2376.76	31.44	0.0034	0.53	194.4
Jul-07	3	MW-76	2407.84	IW-58	2381.16	26.68	0.0028	0.45	165.1
Jan-08	3	MW-76	2407.91	IW-58	2379.99	27.92	0.0030	0.47	172.8
Jul-08	3	MW-76	2408.01	IW-58	2378.03	29.98	0.0032	0.51	185.5
Jan-09	3	MW-76	2407.53	IW-58	2376.90	30.63	0.0033	0.52	189.6
Jul-09	3	MW-76	2407.10	IW-58	2376.58	30.52	0.0033	0.52	188.9
Jan-10	3	MW-76	2406.80	IW-58	2376.70	30.10	0.0032	0.51	186.3
Jul-10	3	MW-76	2406.69	IW-58	2380.73	25.96	0.0028	0.44	160.7
Jan-11	3	MW-76	2406.98	IW-58	2380.63	26.35	0.0028	0.45	163.1
Jul-11	3	MW-76	2407.19	IW-58	2379.86	27.33	0.0029	0.46	169.1
Jan-12	3	MW-76	2406.31	IW-58	2378.98	27.33	0.0029	0.46	169.1
Jul-12	3	MW-52	2404.46	IW-58	2378.54	25.92	0.0028	0.44	160.4

Table VI.B.2.e. - HISTORICAL AQUIFER FLOW CHARACTERISTICS

Alon USA, LP - Big Spring Refinery - Big Spring, Texas

UNIT = **FACILITY-WIDE**

SATURATED ZONE = **UPPER (Saturated Sands of Ogallala Aquifer)**

LINEAR DISTANCE = **(1) 10,480 feet, (2) 10,237 feet, (3) 9,378 feet** *(see NOTE)*

HYDRAULIC CONDUCTIVITY = **1,200 gpm per sq. foot**

POROSITY = **30%**

Event	NOTE	UPGRADIENT Well na	UPGRADIENT Water Level feet-MSL	DOWNGRADIENT Well na	DOWNGRADIENT Water Level feet-MSL	Head Difference feet	FLOW GRADIENT feet/foot	FLOW VELOCITY feet/day	FLOW VELOCITY feet/year
Jan-13	3	MW-52	2404.66	IW-58	2378.93	25.73	0.0027	0.44	159.2
Jul-13	3	MW-52	2404.75	IW-58	2378.10	26.65	0.0028	0.45	164.9
Jan-14	3	MW-52	2404.81	IW-58	2377.97	26.84	0.0029	0.46	166.1
Mar-15	3	MW-52	2405.62	IW-58	2382.10	23.52	0.0025	0.40	145.6
Jul-15	3	MW-52	2405.84	IW-58	2380.22	25.62	0.0027	0.43	158.6
Jan-16	3	MW-52	2405.00	IW-58	2381.65	23.35	0.0025	0.40	144.5
Jul-16	3	MW-52	2406.30	IW-58	2381.79	24.51	0.0026	0.42	151.7
Jan-17	3	MW-52	2406.45	IW-58	2377.91	28.54	0.0030	0.48	176.6
Jul-17	3	MW-52	2406.78	IW-58	2377.46	29.32	0.0031	0.50	181.5
Jan-18	3	MW-52	2406.98	IW-58	2375.83	31.15	0.0033	0.53	192.8
Jul-18	3	MW-52	2406.91	IW-58	2374.92	31.99	0.0034	0.54	198.0
Jan-19	3	MW-52	2406.88	IW-58	2378.09	28.79	0.0031	0.49	178.2
Jul-19	3	MW-52	2407.15	IW-58	2379.42	27.73	0.0030	0.47	171.6
Jan-20	3	MW-52	2407.10	IW-58	2378.33	28.77	0.0031	0.49	178.1
Jul-20	3	MW-52	2407.12	IW-58	2379.75	27.37	0.0029	0.46	169.4
Jan-21	3	MW-52	2406.97	IW-58	2380.36	26.61	0.0028	0.45	164.7
Jul-21	3	MW-52	2406.88	IW-58	2383.49	23.39	0.0025	0.40	144.8
Jan-22	3	MW-52	2406.71	IW-58	2380.82	25.89	0.0028	0.44	160.2
Jul-22	3	MW-52	2406.51	IW-58	2381.87	24.64	0.0026	0.42	152.5
Jan-23	3	MW-52	2406.21	IW-58	2381.10	25.11	0.0027	0.43	155.4
Jul-23	3	MW-52	2406.15	IW-58	2381.44	24.71	0.0026	0.42	152.9
Jan-24	3	MW-52	2405.62	IW-58	2379.70	25.92	0.0028	0.44	160.4
MAX			**2409.89**		**2383.49**	**52.99**	**0.0052**	**0.83**	**302.8**
MIN			**2399.45**		**2356.84**	**23.35**	**0.0025**	**0.40**	**144.5**
AVG			**2407.33**		**2375.23**	**32.10**	**0.0033**	**0.53**	**193.7**
VAR			**10.44**		**26.65**	**29.64**	**0.0027**	**0.43**	**158.3**

Table VI.B.2.e. - HISTORICAL AQUIFER FLOW CHARACTERISTICS

Alon USA, LP - Big Spring Refinery - Big Spring, Texas

UNIT = **FACILITY-WIDE**

SATURATED ZONE = **LOWER (Basal Gravels - Ogallala Aquifer**

LINEAR DISTANCE = **(1) 10,148 feet, (2) 10,246 feet, (3) 9,400 feet** *(see NOTE)*

HYDRAULIC CONDUCTIVITY = **1,200 gpm per sq. foot**

POROSITY = **30%**

Event	NOTE	UPGRADIENT Well na	UPGRADIENT Water Level feet-MSL	DOWNGRADIENT Well na	DOWNGRADIENT Water Level feet-MSL	Head Difference feet	FLOW GRADIENT feet/foot	FLOW VELOCITY feet/day	FLOW VELOCITY feet/year
Oct-92	1	MW-76A	2408.31	MW-79A	2367.90	40.41	0.0040	1.75	640.4
Mar-93	1	MW-76A	2408.33	MW-79A	2368.03	40.30	0.0040	1.75	638.6
Oct-93	1	MW-76A	2408.39	MW-79A	2367.87	40.52	0.0040	1.76	642.1
Mar-94	1	MW-76A	2409.54	MW-79A	2367.97	41.57	0.0041	1.80	658.8
Apr-95	1	MW-76A	2399.41	MW-79A	2366.10	33.31	0.0033	1.45	527.9
Oct-95	1	MW-76A	2409.58	MW-79A	2365.37	44.21	0.0044	1.92	700.6
Jan-96	1	MW-76A	2409.88	MW-79A	2366.52	43.36	0.0043	1.88	687.1
Jul-96	1	MW-76A	2409.77	MW-79A	2356.47	53.30	0.0053	2.31	844.7
Jan-97	1	MW-76A	2409.37	MW-79A	2366.90	42.47	0.0042	1.84	673.0
Jul-97	1	MW-76A	2409.37	MW-79A	2367.11	42.26	0.0042	1.83	669.7
Jan-98	2	MW-76A	2409.66	MW-78A	2363.80	45.86	0.0045	1.97	719.8
Jul-98	2	MW-76A	2409.48	MW-78A	2371.96	37.52	0.0037	1.61	588.9
Jan-99	2	MW-76A	2409.26	MW-78A	2372.89	36.37	0.0035	1.56	570.8
Jul-99	2	MW-76A	2409.26	MW-78A	2365.03	44.23	0.0043	1.90	694.2
Jan-00	2	MW-76A	2409.51	MW-78A	2361.57	47.94	0.0047	2.06	752.4
Jul-00	3	MW-76A	2409.01	IW-58A	2372.76	36.25	0.0039	1.70	620.2
Jan-01	3	MW-76A	2408.76	IW-58A	2372.80	35.96	0.0038	1.69	615.2
Jul-01	3	MW-76A	2408.58	IW-58A	2372.73	35.85	0.0038	1.68	613.3
Jan-02	3	MW-76A	2408.42	IW-58A	2374.31	34.11	0.0036	1.60	583.6
Jul-02	3	MW-76A	2408.28	IW-58A	2374.04	34.24	0.0036	1.60	585.8
Jan-03	3	MW-76A	2408.11	IW-58A	2373.16	34.95	0.0037	1.64	597.9
Jul-03	3	MW-76A	2407.98	IW-58A	2373.26	34.72	0.0037	1.63	594.0
Jan-04	3	MW-76A	2407.86	IW-58A	2373.09	34.77	0.0037	1.63	594.8
Jul-04	3	MW-76A	2407.91	IW-58A	2373.84	34.07	0.0036	1.60	582.9
Jan-05	3	MW-76A	2408.36	IW-58A	2377.48	30.88	0.0033	1.45	528.3
Jul-05	3	MW-76A	2409.13	IW-58A	2377.14	31.99	0.0034	1.50	547.3
Jan-06	3	MW-76A	2409.10	IW-58A	2376.70	32.40	0.0034	1.52	554.3
Jul-06	3	MW-76A	2408.67	IW-58A	2376.63	32.04	0.0034	1.50	548.1
Jan-07	3	MW-76A	2408.21	IW-58A	2376.61	31.60	0.0034	1.48	540.6
Jul-07	3	MW-76A	2407.85	IW-58A	2378.96	28.89	0.0031	1.35	494.3
Jan-08	3	MW-76A	2408.02	IW-58A	2379.77	28.25	0.0030	1.32	483.3
Jul-08	3	MW-76A	2408.01	IW-58A	2374.43	33.58	0.0036	1.57	574.5
Jan-09	3	MW-76A	2407.49	IW-58A	2376.73	30.76	0.0033	1.44	526.2
Jul-09	3	MW-76A	2407.06	IW-58A	2376.52	30.54	0.0032	1.43	522.5
Jan-10	3	MW-76A	2406.76	IW-58A	2376.61	30.15	0.0032	1.41	515.8
Jul-10	3	MW-76A	2406.66	IW-58A	2380.50	26.16	0.0028	1.23	447.5
Jan-11	3	MW-76A	2406.82	IW-58A	2380.47	26.35	0.0028	1.24	450.8
Jul-11	3	MW-76A	2407.06	IW-58A	2379.71	27.35	0.0029	1.28	467.9
Jan-12	3	MW-76A	2406.17	IW-58A	2378.89	27.28	0.0029	1.28	466.7
Jul-12	3	MW-52A	2402.28	IW-58A	2378.41	23.87	0.0025	1.12	408.4

Table VI.B.2.e. - HISTORICAL AQUIFER FLOW CHARACTERISTICS

Alon USA, LP - Big Spring Refinery - Big Spring, Texas

UNIT = **FACILITY-WIDE**

SATURATED ZONE = **LOWER (Basal Gravels - Ogallala Aquifer**

LINEAR DISTANCE = **(1) 10,148 feet, (2) 10,246 feet, (3) 9,400 feet** *(see NOTE)*

HYDRAULIC CONDUCTIVITY = **1,200 gpm per sq. foot**

POROSITY = **30%**

Event	NOTE	UPGRADIENT Well na	UPGRADIENT Water Level feet-MSL	DOWNGRADIENT Well na	DOWNGRADIENT Water Level feet-MSL	Head Difference feet	FLOW GRADIENT feet/foot	FLOW VELOCITY feet/day	FLOW VELOCITY feet/year
Jan-13	3	MW-52A	2402.58	IW-58A	2378.85	23.73	0.0025	1.11	406.0
Jul-13	3	MW-52A	2402.76	IW-58A	2377.98	24.78	0.0026	1.16	423.9
Jan-14	3	MW-52A	2402.87	IW-58A	2377.89	24.98	0.0027	1.17	427.4
Mar-15	3	MW-52A	2404.10	IW-58A	2381.88	22.22	0.0024	1.04	380.1
Jul-15	3	MW-52A	2404.37	IW-58A	2382.80	21.57	0.0023	1.01	369.0
Jan-16	3	MW-52A	2404.00	IW-58A	2384.19	19.81	0.0021	0.93	338.9
Jul-16	3	MW-52A	2404.88	IW-58A	2384.34	20.54	0.0022	0.96	351.4
Jan-17	3	MW-52A	2405.07	IW-58A	2380.38	24.69	0.0026	1.16	422.4
Jul-17	3	MW-52A	2405.36	IW-58A	2379.94	25.42	0.0027	1.19	434.9
Jan-18	3	MW-52A	2405.58	IW-58A	2378.23	27.35	0.0029	1.28	467.9
Jul-18	3	MW-52A	2405.32	IW-58A	2377.34	27.98	0.0030	1.31	478.7
Jan-19	3	MW-52A	2405.44	IW-58A	2380.60	24.84	0.0026	1.16	425.0
Jul-19	3	MW-52A	2405.73	IW-58A	2381.93	23.80	0.0025	1.12	407.2
Jan-20	3	MW-52A	2405.60	IW-58A	2380.81	24.79	0.0026	1.16	424.1
Jul-20	3	MW-52A	2405.54	IW-58A	2381.93	23.61	0.0025	1.11	403.9
Jan-21	3	MW-52A	2405.47	IW-58A	2382.91	22.56	0.0024	1.06	386.0
Jul-21	3	MW-52A	2405.41	IW-58A	2386.05	19.36	0.0021	0.91	331.2
Jan-22	3	MW-52A	2405.49	IW-58A	2383.25	22.24	0.0024	1.04	380.5
Jul-22	3	MW-52A	2405.44	IW-58A	2384.33	21.11	0.0022	0.99	361.2
Jan-23	3	MW-52A	2405.36	IW-58A	2383.57	21.79	0.0023	1.02	372.8
Jul-23	3	MW-52A	2405.42	IW-58A	2383.94	21.48	0.0023	1.01	367.5
Jan-24	3	MW-52A	2404.73	IW-58A	2382.12	22.61	0.0024	1.06	386.8
MAX			**2409.88**		**2386.05**	**53.30**	**0.0053**	**2.31**	**844.7**
MIN			**2399.41**		**2356.47**	**19.36**	**0.0021**	**0.91**	**331.2**
AVG			**2406.91**		**2375.75**	**31.16**	**0.0032**	**1.42**	**519.7**
VAR			**10.47**		**29.58**	**33.94**	**0.0032**	**1.41**	**513.4**

Table VI.B.3.b.[1] – Unit Groundwater Detection Monitoring Systems
(from Page 112 of the Part B Application)

Well Number(s):	SITE H LTU:					
	MW-52	**MW-52A**	**MW-53**	**MW-53A**	**MW-54**	**MW-54A**
Hydrogeologic Unit Monitored	Upper Sand	Basal Gravel	Upper Sand	Basal Gravel	Upper Sand	Basal Gravel
Type (e.g., point of compliance, background, observation, etc.)	BKGRD	BKGRD	BKGRD	BKGRD	POC	POC
Up or Down Gradient	Up	Up	Up	Up	Down	Down
Casing Diameter and Material	2-inch PVC	2-inch PVC	2-inch PVC	2-inch PVC	2-inch PVC	2-inch PVC
Screen Diameter and Material	2-inch PVC	2-inch PVC	2-inch PVC	2-inch PVC	2-inch PVC	2-inch PVC
Screen Slot Size (in.)	0.02	0.02	0.02	0.02	0.02	0.02
Top of Casing Elevation (MSL)	2517.86	2517.82	2511.27	2511.12	2506.96	2507.27
Grade or Surface Elevation (MSL)	2515.1	2515.08	2508.11	2507.99	2505.16	2505.31
Well Depth (Ft, Below Grade Surface *[BGS]*)	125	157	112.8	133.9	116.7	136
Well Depth (Ft, Below Top of Casing *[BTOC]*)	127.8	159.7	116	137	118.5	138
Screen Interval						
From(Ft, BGS)	105	137	92.8	113.9	96.7	116
To(Ft, BGS)	125	157	112.8	133.9	116.7	136
Screen Interval:						
From(Ft, BTOC)	107.8	139.7	96	117	98.5	118
To(Ft, BTOC)	127.8	159.7	116	137	118.5	138
Facility Coordinates (Texas Planar Grid Coordinates)	N 247820.4 E 790138.4	N 247818.2 E 790127.3	N 247196.8 E 790619.6	N 247195.7 E 790608.5	N 247067.6 E 790035.9	N 247060.3 E 790053.3

1From Tables in Section V.

MSL: Mean Sea Level; *MLGL*: Mean Low-tide Gulf Level;

BGS: Below Grade Surface; BTOC: Below Top of Casing

Table VI.B.3.b.[1] – Unit Groundwater Detection Monitoring Systems
(from Page 112 of the Part B Application)

Well Number(s):	SITE H LTU:					
	MW-74	MW-74A	MW-75	MW-75A	MW-76	MW-76A
Hydrogeologic Unit Monitored	Upper Sand	Basal Gravel	Upper Sand	Basal Gravel	Upper Sand	Basal Gravel
Type (e.g., point of compliance, background, observation, etc.)	POC	POC	POC	POC	BKGRD	BKGRD
Up or Down Gradient	Down	Down	Down	Down	Up	Up
Casing Diameter and Material	2-inch PVC	2-inch PVC	2-inch PVC	2-inch PVC	2-inch PVC	2-inch PVC
Screen Diameter and Material	2-inch PVC	2-inch PVC	2-inch PVC	2-inch PVC	2-inch PVC	2-inch PVC
Screen Slot Size (in.)	0.02	0.02	0.02	0.02	0.02	0.02
Top of Casing Elevation (MSL)	2509.55	2509.54	2508.38	2508.38	2522.21	2521.89
Grade or Surface Elevation (MSL)	2506.61	2506.54	2506.66	2506.65	2519.4	2518.99
Well Depth (Ft, Below Grade Surface *[BGS]*)	111.1	143	113.3	153.3	120	158
Well Depth (Ft, Below Top of Casing *[BTOC]*)	114	146	115	155	122.8	160.9
Screen Interval						
From(Ft, BGS)	91.1	123	93.3	133.3	100	138
To(Ft, BGS)	111.1	143	113.3	153.3	120	158
Screen Interval:						
From(Ft, BTOC)	94	126	95	135	102.8	140.9
To(Ft, BTOC)	114	146	115	155	122.8	160.9
Facility Coordinates (Texas Planar Grid Coordinates)	N 247164.6 E 790468.0	N 247160.3 E 790458.6	N 247088.8 E 790222.1	N 247091.9 E 790230.2	N 247976.0 E 790629.8	N 247974.8 E 790620.7

1From Tables in Section V.

MSL: Mean Sea Level; *MLGL*: Mean Low-tide Gulf Level;

BGS: Below Grade Surface; BTOC: Below Top of Casing

Table VI.B.3.b.[1] – Unit Groundwater Detection Monitoring Systems
(from Page 112 of the Part B Application)

Well Number(s):	SITE H LTU:					
	MW-77	MW-77A				
Hydrogeologic Unit Monitored	Upper Sand	Basal Gravel				
Type (e.g., point of compliance, background, observation, etc.)	POC	POC				
Up or Down Gradient	Down	Down				
Casing Diameter and Material	2-inch PVC	2-inch PVC				
Screen Diameter and Material	2-inch PVC	2-inch PVC				
Screen Slot Size (in.)	0.02	0.02				
Top of Casing Elevation (MSL)	2511.59	2511.86				
Grade or Surface Elevation (MSL)	2508.77	2508.99				
Well Depth (Ft, Below Grade Surface *[BGS]*)	117.2	147.1				
Well Depth (Ft, Below Top of Casing *[BTOC]*)	120	150				
Screen Interval From(Ft, BGS) To(Ft, BGS)	 97.2 117.2	 127.1 147.1				
Screen Interval: From(Ft, BTOC) To(Ft, BTOC)	 100 120	 130 150				
Facility Coordinates (Texas Planar Grid Coordinates)	N 247474.5 E 790109.5	N 247481.8 E 790113.4				

1From Tables in Section V.

MSL: Mean Sea Level; *MLGL*: Mean Low-tide Gulf Level;

BGS: Below Grade Surface; BTOC: Below Top of Casing

Table VI.B.3.b - GROUNDWATER MONITORING SYSTEM RESULTS - BICA and SITE E PROGRAMS

Alon USA LP - Big Spring Refinery

Well No.	Screen	Program	Constituent	$^{GW}GW_{Class3}$ (mg/L)	Units	PRE-PERMIT ANALYSIS								
						Jul-10	Jan-11	Jul-11	Jan-12	Jul-12	Jan-13	Jul-13	Jan-14	Jul-14
MW-38	A	SITE E	Benzene	0.5	mg/L	0.077	0.059	0.0531	0.0941	0.0326	0.0347	0.0888	0.0584	0.0337
MW-38	A	SITE E	Benzenethiol	0.24	mg/L	<0.54	<0.2	0.21	0.079	0.0874	0.0771	0.0935	0.164	0.0781
MW-38	A	SITE E	Ethylbenzene	70	mg/L	0.034	0.031	0.0228	0.0501	0.0119	0.0138	0.0314	0.0222	0.011
MW-38	A	SITE E	Toluene	100	mg/L	0.016	0.013	0.0112	0.0201	0.0057	0.0065	0.0142	0.0106	0.0057
MW-38	A	SITE E	Xylenes, total	1000	mg/L	0.028	0.0207	0.0183	0.0336	0.0097	0.0126	0.0247	0.0165	0.0089
MW-38	A	SITE E	Acetone	2200	mg/L	0.013	<0.1	0.0564	0.0233	0.0246	0.0269	0.0298	0.0118	0.0337
MW-38	A	SITE E	Carbon disulfide	240	mg/L	<0.005	<0.005	<0.00036	<0.00036	<0.00036	<0.00036	<0.00036	<0.00036	<0.00036
MW-38	A	SITE E	Methyl ethyl Ketone	1500	mg/L	<0.012	<0.1	0.0136	<0.0018	0.0075	0.0053	0.0081	0.003	0.0078
MW-38	A	SITE E	Cresols, totals	120	mg/L	1.9	0.32	0.284	0.0038	0.0028	0.0054	<0.0048	0.0098	0.0076
MW-38	A	SITE E	Diethyl phthalate	2000	mg/L	<0.054	<0.02	<0.022	<0.0011	0.0012	<0.0061	<0.0061	<0.0058	<0.0014
MW-38	A	SITE E	2,4-Dimethylphenol	49	mg/L	1	0.4	0.392	0.183	0.119	0.321	0.0578	0.111	0.0403
MW-38	A	SITE E	1-Methyl naphthalene	3.1	mg/L	0.12	0.1	0.0968	0.0852	0.0686	0.0797	0.0659	0.0826	0.0701
MW-38	A	SITE E	2-Methyl naphthalene	9.8	mg/L	<0.054	<0.02	<0.026	<0.0013	<0.0013	<0.0048	<0.0048	<0.0052	<0.0012
MW-38	A	SITE E	Napthalene	49	mg/L	<0.054	<0.02	<0.023	0.0121	0.0088	0.0115	0.008	0.0082	0.0067
MW-38	A	SITE E	Pentachlorophenol	0.1	mg/L	<0.27	<0.1	0.0124	0.0109	0.0037	0.003	0.0022	0.0023	0.0015
MW-38	A	SITE E	Phenol	730	mg/L	<0.054	<0.02	<0.016	<0.00076	0.0013	<0.0059	<0.0059	<0.0061	<0.0015
MW-38	A	SITE E	Pyridine	2.4	mg/L	<0.054	<0.02	<0.02	<0.001	<0.0010	<0.017	<0.017	<0.0053	<0.0013
MW-38	A	SITE E	Arsenic	1	mg/L	0.102	<0.2	0.0788	0.0775	0.0967	0.0937	0.0905	0.0973	0.132
MW-38	A	SITE E	Beryllium	0.4	mg/L	<0.005	<0.04	0.0008	<0.001	<0.00064	<0.00064	<0.00064	<0.00064	<0.00064
MW-38	A	SITE E	Nickel	49	mg/L	0.0428	0.0568	0.0372	0.0401	0.0433	0.0505	0.0453	0.0469	0.0578
MW-38	A	SITE E	Selenium	5	mg/L	<0.01	<0.2	0.00089	<0.001	0.0022	<0.0014	0.002	0.0046	<0.0014
MW-38	A	SITE E	Vanadium	4.4	mg/L	<0.005	<0.05	0.0018	<0.002	0.0011	0.0023	0.0028	0.0024	0.0049
MW-38	A	SITE E	D. O.	na	mg/L	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-38	A	SITE E	ORP	na	mV	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-38	A	SITE E	pH	na	stnd unit	7.19	7.86	6.17	7.45	8.67	6.13	7.06	7.48	7.18
MW-38	A	SITE E	Specific Conductance	na	µmhos/cm	13,450	13,800	8,060	13,700	15	13,200	12,600	5	4,590
MW-38	A	SITE E	Temperature	na	oC	22.7	13.8	30.0	18.2	25.3	19.7	21.8	20.4	26.2
MW-38	A	SITE E	Turbidity	na	NTU	0.00	10.60	89.10	120.00	343.00	37.80	34.00	800.00	115.00
MW-38A	B	SITE E	Benzene	0.5	mg/L	0.16	0.11	0.208	0.144	0.188	0.162	0.197	0.18	0.158
MW-38A	B	SITE E	Benzenethiol	0.24	mg/L	<0.52	<0.2	0.221	0.0298	0.0757	0.0827	0.24	0.115	0.0117
MW-38A	B	SITE E	Ethylbenzene	70	mg/L	0.078	0.061	0.073	0.0713	0.0557	0.0652	0.0971	0.0847	0.0854
MW-38A	B	SITE E	Toluene	100	mg/L	0.036	0.027	0.0683	0.0362	0.0466	0.0355	0.0495	0.0419	0.0406
MW-38A	B	SITE E	Xylenes, total	1000	mg/L	0.041	0.033	0.0954	0.0473	0.0611	0.0484	0.0791	0.0551	0.0551
MW-38A	B	SITE E	Acetone	2200	mg/L	<0.012	<0.1	0.02	0.062	0.0181	0.0655	0.0355	0.0357	0.027
MW-38A	B	SITE E	Carbon disulfide	240	mg/L	<0.005	<0.005	0.00045	0.0013	<0.00036	0.00038	0.00043	0.0004	<0.00036
MW-38A	B	SITE E	Methyl ethyl Ketone	1500	mg/L	<0.012	<0.1	<0.0018	0.019	0.0049	0.0347	0.0163	0.0157	0.0057
MW-38A	B	SITE E	Cresols, totals	120	mg/L	0.41	0.743	4.8681	0.019	0.0235	0.027	0.3222	0.1266	0.0628
MW-38A	B	SITE E	Diethyl phthalate	2000	mg/L	<0.052	<0.02	<0.022	<0.0011	<0.0043	<0.0061	<0.0061	<0.0056	<0.0056
MW-38A	B	SITE E	2,4-Dimethylphenol	49	mg/L	0.31	0.36	2.8	0.41	1.72	0.668	1.12	0.771	0.638
MW-38A	B	SITE E	1-Methyl naphthalene	3.1	mg/L	0.14	0.14	0.145	0.0925	0.0339	0.131	0.157	0.175	0.144
MW-38A	B	SITE E	2-Methyl naphthalene	9.8	mg/L	<0.052	<0.02	<0.026	0.0066	0.0228	0.0087	0.008	0.0086	0.0054
MW-38A	B	SITE E	Napthalene	49	mg/L	0.071	0.079	0.0949	0.0588	0.222	0.0729	0.0696	0.062	0.054
MW-38A	B	SITE E	Pentachlorophenol	0.1	mg/L	<0.26	<0.1	0.037	0.0146	0.0238	0.0044	0.0086	0.0042	0.0047
MW-38A	B	SITE E	Phenol	730	mg/L	<0.052	<0.02	<0.015	<0.00078	<0.003	<0.0059	<0.0059	<0.0059	<0.0059

Table VI.B.3.b - GROUNDWATER MONITORING SYSTEM RESULTS - BICA and SITE E PROGRAMS

Alon USA LP - Big Spring Refinery

Well No.	Screen	Program	Constituent	$^{GW}GW_{Class3}$ (mg/L)	Units	CURRENT PERMIT ANALYSIS								
						Mar-15	Jul-15	Jan-16	Jul-16	Jan-17	Jul-17	Jan-18	Jul-18	Jan-19
MW-38	A	SITE E	Benzene	0.5	mg/L	0.178	0.18	0.177	0.182	0.181	0.153	0.172	0.221	0.236
MW-38	A	SITE E	Benzenethiol	0.24	mg/L	0.0366	0.108	0.0457	0.0312	0.0288	0.0349	0.0462	0.0483	0.0306
MW-38	A	SITE E	Ethylbenzene	70	mg/L	0.0737	0.0564	0.0621	0.0717	0.0718	0.0649	0.0642	0.0793	0.0792
MW-38	A	SITE E	Toluene	100	mg/L	0.0359	0.0295	0.0342	0.0405	0.0417	0.0346	0.0386	0.05	0.0507
MW-38	A	SITE E	Xylenes, total	1000	mg/L	0.0468	0.0364	0.0405	0.0443	0.05	0.0451	0.0441	0.0601	0.0591
MW-38	A	SITE E	Acetone	2200	mg/L	na	na	na	na	na	na	na	na	na
MW-38	A	SITE E	Carbon disulfide	240	mg/L	na	na	na	na	na	na	na	na	na
MW-38	A	SITE E	Methyl ethyl Ketone	1500	mg/L	na	na	na	na	na	na	na	na	na
MW-38	A	SITE E	Cresols, totals	120	mg/L	na	na	na	na	na	na	na	na	na
MW-38	A	SITE E	Diethyl phthalate	2000	mg/L	na	na	na	na	na	na	na	na	na
MW-38	A	SITE E	2,4-Dimethylphenol	49	mg/L	na	na	na	na	na	na	na	na	na
MW-38	A	SITE E	1-Methyl naphthalene	3.1	mg/L	na	na	na	na	na	na	na	na	na
MW-38	A	SITE E	2-Methyl naphthalene	9.8	mg/L	na	na	na	na	na	na	na	na	na
MW-38	A	SITE E	Napthalene	49	mg/L	na	na	na	na	na	na	na	na	na
MW-38	A	SITE E	Pentachlorophenol	0.1	mg/L	na	na	na	na	na	na	na	na	na
MW-38	A	SITE E	Phenol	730	mg/L	na	na	na	na	na	na	na	na	na
MW-38	A	SITE E	Pyridine	2.4	mg/L	na	na	na	na	na	na	na	na	na
MW-38	A	SITE E	Arsenic	1	mg/L	na	na	na	na	na	na	na	na	na
MW-38	A	SITE E	Beryllium	0.4	mg/L	na	na	na	na	na	na	na	na	na
MW-38	A	SITE E	Nickel	49	mg/L	na	na	na	na	na	na	na	na	na
MW-38	A	SITE E	Selenium	5	mg/L	na	na	na	na	na	na	na	na	na
MW-38	A	SITE E	Vanadium	4.4	mg/L	na	na	na	na	na	na	na	na	na
MW-38	A	SITE E	D. O.	na	mg/L	2.1	2.5	1.8	1.7	1.9	1.3	2.1	1.1	1.8
MW-38	A	SITE E	ORP	na	mV	nm	nm	nm	(191.2)	(130.4)	(47.4)	(186.5)	(119.8)	(97.1)
MW-38	A	SITE E	pH	na	stnd unit	6.64	6.65	6.72	6.62	6.65	6.69	6.75	6.53	6.56
MW-38	A	SITE E	Specific Conductance	na	µmhos/cm	nm	nm	nm	nm	nm	nm	11,620	12,900	12,910
MW-38	A	SITE E	Temperature	na	oC	nm	nm	nm	nm	nm	nm	19.4	26.5	19.3
MW-38	A	SITE E	Turbidity	na	NTU	nm	nm	nm	nm	nm	nm	5.20	8.40	22.00
MW-38A	B	SITE E	Benzene	0.5	mg/L	0.145	0.179	0.242	0.242	0.331	0.431	0.332	0.461	0.468
MW-38A	B	SITE E	Benzenethiol	0.24	mg/L	0.0548	0.167	0.293	0.0771	0.109	0.142	0.151	0.138	0.0449
MW-38A	B	SITE E	Ethylbenzene	70	mg/L	0.0992	0.0697	0.0564	0.0608	0.0773	0.0853	0.0762	0.0814	0.0965
MW-38A	B	SITE E	Toluene	100	mg/L	0.0413	0.0412	0.0423	0.043	0.0582	0.0644	0.055	0.0636	0.0166
MW-38A	B	SITE E	Xylenes, total	1000	mg/L	0.0622	0.0507	0.0408	0.0395	0.0591	0.0613	0.0571	0.0606	0.0696
MW-38A	B	SITE E	Acetone	2200	mg/L	na	na	na	na	na	na	na	na	na
MW-38A	B	SITE E	Carbon disulfide	240	mg/L	na	na	na	na	na	na	na	na	na
MW-38A	B	SITE E	Methyl ethyl Ketone	1500	mg/L	na	na	na	na	na	na	na	na	na
MW-38A	B	SITE E	Cresols, totals	120	mg/L	na	na	na	na	na	na	na	na	na
MW-38A	B	SITE E	Diethyl phthalate	2000	mg/L	na	na	na	na	na	na	na	na	na
MW-38A	B	SITE E	2,4-Dimethylphenol	49	mg/L	na	na	na	na	na	na	na	na	na
MW-38A	B	SITE E	1-Methyl naphthalene	3.1	mg/L	na	na	na	na	na	na	na	na	na
MW-38A	B	SITE E	2-Methyl naphthalene	9.8	mg/L	na	na	na	na	na	na	na	na	na
MW-38A	B	SITE E	Napthalene	49	mg/L	na	na	na	na	na	na	na	na	na
MW-38A	B	SITE E	Pentachlorophenol	0.1	mg/L	na	na	na	na	na	na	na	na	na
MW-38A	B	SITE E	Phenol	730	mg/L	na	na	na	na	na	na	na	na	na

Table VI.B.3.b - GROUNDWATER MONITORING SYSTEM RESULTS - BICA and SITE E PROGRAMS

Alon USA LP - Big Spring Refinery

Well No.	Screen	Program	Constituent	$^{GW}GW_{Class3}$ (mg/L)	Units	CURRENT PERMIT ANALYSIS								
						Jul-19	Jan-20	Jul-20	Jan-21	Jul-21	Jan-22	Jul-22	Jan-23	Jul-23
MW-38	A	SITE E	Benzene	0.5	mg/L	0.185	0.231	0.2420	0.242	0.2850	0.3580	PSH	0.4020	PSH
MW-38	A	SITE E	Benzenethiol	0.24	mg/L	0.0353	0.0324	0.0363	0.0363	0.0297	0.0551	Thickness	0.0312	Thickness
MW-38	A	SITE E	Ethylbenzene	70	mg/L	0.0578	0.0707	0.0777	0.0777	0.0747	0.0771	In Feet	0.0834	In Feet
MW-38	A	SITE E	Toluene	100	mg/L	0.0369	0.0511	0.0533	0.0533	0.0544	0.0692	0.12	0.0820	0.17
MW-38	A	SITE E	Xylenes, total	1000	mg/L	0.0448	0.0568	0.0581	0.0581	0.0573	0.0683	na	0.0694	na
MW-38	A	SITE E	Acetone	2200	mg/L	na	na	na	na	<0.10	na	na	0.0121	na
MW-38	A	SITE E	Carbon disulfide	240	mg/L	na	na	na	na	<0.010	na	na	<0.00027	na
MW-38	A	SITE E	Methyl ethyl Ketone	1500	mg/L	na	na	na	na	<0.017	na	na	0.0020	na
MW-38	A	SITE E	Cresols, totals	120	mg/L	na	na	na	na	0.0058	na	na	0.0040	na
MW-38	A	SITE E	Diethyl phthalate	2000	mg/L	na	na	na	na	<0.001	na	na	0.0167	na
MW-38	A	SITE E	2,4-Dimethylphenol	49	mg/L	na	na	na	na	0.0349	na	na	0.0401	na
MW-38	A	SITE E	1-Methyl naphthalene	3.1	mg/L	na	na	na	na	0.0840	na	na	0.0796	na
MW-38	A	SITE E	2-Methyl naphthalene	9.8	mg/L	na	na	na	na	<0.0013	na	na	<0.00032	na
MW-38	A	SITE E	Napthalene	49	mg/L	na	na	na	na	0.0115	na	na	0.0104	na
MW-38	A	SITE E	Pentachlorophenol	0.1	mg/L	na	na	na	na	0.0034	na	na	0.0161	na
MW-38	A	SITE E	Phenol	730	mg/L	na	na	na	na	0.0014	na	na	<0.0004	na
MW-38	A	SITE E	Pyridine	2.4	mg/L	na	na	na	na	<0.0011	na	na	<0.0037	na
MW-38	A	SITE E	Arsenic	1	mg/L	na	na	na	na	0.1780	na	na	0.0981	na
MW-38	A	SITE E	Beryllium	0.4	mg/L	na	na	na	na	<0.0005	na	na	<0.0038	na
MW-38	A	SITE E	Nickel	49	mg/L	na	na	na	na	0.0826	na	na	0.0436	na
MW-38	A	SITE E	Selenium	5	mg/L	na	na	na	na	0.0028	na	na	<0.014	na
MW-38	A	SITE E	Vanadium	4.4	mg/L	na	na	na	na	0.0028	na	na	<0.0018	na
MW-38	A	SITE E	D. O.	na	mg/L	2.2	2.4	1.4	1.4	1.6	1.3	nm	2.8	nm
MW-38	A	SITE E	ORP	na	mV	(123.2)	(80.6)	(124.6)	(124.6)	(97.1)	(73.8)	nm	(89.8)	nm
MW-38	A	SITE E	pH	na	stnd unit	6.66	6.50	6.59	6.59	6.65	6.65	nm	6.83	nm
MW-38	A	SITE E	Specific Conductance	na	µmhos/cm	13,060	13,650	14,590	14,590	16,100	15,950	nm	1,623	nm
MW-38	A	SITE E	Temperature	na	oC	23.6	20.9	25.6	25.6	18.9	23.1	nm	15.8	nm
MW-38	A	SITE E	Turbidity	na	NTU	9.60	9.10	8.00	8.00	9.50	8.90	nm	6.0	nm
MW-38A	B	SITE E	Benzene	0.5	mg/L	0.298	0.3590	0.1990	0.1990	0.1710	0.1100	0.1990	0.3990	0.3900
MW-38A	B	SITE E	Benzenethiol	0.24	mg/L	0.0487	0.0430	0.0334	0.0334	0.0132	0.0430	<0.00012	0.0342	<0.0011
MW-38A	B	SITE E	Ethylbenzene	70	mg/L	0.066	0.0824	0.0867	0.0867	0.0878	0.0764	0.0848	0.0889	0.0992
MW-38A	B	SITE E	Toluene	100	mg/L	0.0482	0.0617	0.0448	0.0448	0.0379	0.0297	0.0438	0.0729	0.0668
MW-38A	B	SITE E	Xylenes, total	1000	mg/L	0.0463	0.0582	0.0463	0.0463	0.0405	0.0416	0.0406	0.0599	0.0663
MW-38A	B	SITE E	Acetone	2200	mg/L	na	na	na	na	<0.10	na	<0.0011	0.0258	na
MW-38A	B	SITE E	Carbon disulfide	240	mg/L	na	na	na	na	<0.010	na	<0.00027	<0.0014	na
MW-38A	B	SITE E	Methyl ethyl Ketone	1500	mg/L	na	na	na	na	<0.017	na	<0.00078	0.0072	na
MW-38A	B	SITE E	Cresols, totals	120	mg/L	na	na	na	na	0.0055	na	<0.000028	0.0040	na
MW-38A	B	SITE E	Diethyl phthalate	2000	mg/L	na	na	na	na	<0.001	na	0.0091	0.0143	na
MW-38A	B	SITE E	2,4-Dimethylphenol	49	mg/L	na	na	na	na	0.0894	na	0.0759	0.0591	na
MW-38A	B	SITE E	1-Methyl naphthalene	3.1	mg/L	na	na	na	na	0.1480	na	0.1740	0.1610	na
MW-38A	B	SITE E	2-Methyl naphthalene	9.8	mg/L	na	na	na	na	<0.0013	na	<0.000061	<0.00032	na
MW-38A	B	SITE E	Napthalene	49	mg/L	na	na	na	na	0.0295	na	0.0197	0.0203	na
MW-38A	B	SITE E	Pentachlorophenol	0.1	mg/L	na	na	na	na	0.0022	na	0.0013	0.0075	na
MW-38A	B	SITE E	Phenol	730	mg/L	na	na	na	na	<0.0011	na	<0.000028	<0.0009	na

Table VI.B.3.b - GROUNDWATER MONITORING SYSTEM RESULTS - BICA and SITE E PROGRAMS

Alon USA LP - Big Spring Refinery

Well No.	Screen	Program	Constituent	$^{GW}GW_{Class3}$ (mg/L)	Units	PRE-PERMIT ANALYSIS								
						Jul-10	Jan-11	Jul-11	Jan-12	Jul-12	Jan-13	Jul-13	Jan-14	Jul-14
MW-38A	B	SITE E	Pyridine	2.4	mg/L	<0.052	<0.02	<0.02	<0.001	<0.004	<0.017	<0.017	<0.0051	<0.0051
MW-38A	B	SITE E	Arsenic	1	mg/L	0.0462	<0.2	0.0803	0.038	0.0836	0.0423	0.0543	0.0469	0.0685
MW-38A	B	SITE E	Beryllium	0.4	mg/L	<0.005	<0.04	0.00012	<0.005	<0.00064	<0.00064	<0.00064	<0.0064	<0.00064
MW-38A	B	SITE E	Nickel	49	mg/L	0.0309	0.0793	0.0488	0.0321	0.06	0.033	0.0406	0.0351	0.0422
MW-38A	B	SITE E	Selenium	5	mg/L	<0.01	<0.4	0.00093	<0.00083	0.0032	<0.0027	0.0025	0.0043	<0.0014
MW-38A	B	SITE E	Vanadium	4.4	mg/L	<0.005	<0.05	0.0064	<0.01	0.0069	0.0056	0.0075	0.006	0.0011
MW-38A	B	SITE E	D. O.	na	mg/L	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-38A	B	SITE E	ORP	na	mV	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-38A	B	SITE E	pH	na	stnd unit	6.48	7.13	6.00	6.81	6.88	5.69	6.24	7.59	6.76
MW-38A	B	SITE E	Specific Conductance	na	µmhos/cm	64,620	45,500	32,800	63,500	31,900	64,100	47,900	55,100	43,400
MW-38A	B	SITE E	Temperature	na	oC	22.9	17.3	28.8	19.6	27.7	21.0	20.5	20.0	23.1
MW-38A	B	SITE E	Turbidity	na	NTU	0.00	1.48	111.00	18.10	45.80	0.00	5.92	8.90	7.00
MW-39	A	SITE E	Benzene	0.5	mg/L	0.37	0.28	0.288	0.26	0.185	0.182	0.235	0.271	0.297
MW-39	A	SITE E	Benzenethiol	0.24	mg/L	<0.51	<0.25	0.237	0.0849	0.0719	0.0938	0.127	0.0453	0.0693
MW-39	A	SITE E	Ethylbenzene	70	mg/L	0.39	0.3	0.169	0.252	0.177	0.104	0.192	0.237	0.261
MW-39	A	SITE E	Toluene	100	mg/L	0.26	0.16	0.132	0.203	0.153	0.0993	0.119	0.166	0.161
MW-39	A	SITE E	Xylenes, total	1000	mg/L	0.31	0.222	0.205	0.241	0.165	0.0975	0.186	0.185	0.202
MW-39	A	SITE E	Acetone	2200	mg/L	<0.012	<0.1	0.0194	<0.01	0.0198	<0.010	0.0261	0.0139	0.011
MW-39	A	SITE E	Carbon disulfide	240	mg/L	<0.005	<0.005	0.0016	0.0025	0.0013	0.00086	0.0017	0.0016	0.0015
MW-39	A	SITE E	Methyl ethyl Ketone	1500	mg/L	<0.012	<0.1	0.002	<0.0018	0.005	0.0064	0.0065	<0.0027	0.0027
MW-39	A	SITE E	Cresols, totals	120	mg/L	0.373	0.294	0.0635	0.0206	0.0209	0.0123	0.0886	0.1033	0.1078
MW-39	A	SITE E	Diethyl phthalate	2000	mg/L	<0.051	<0.025	<0.022	<0.0022	<0.0043	<0.0061	<0.0061	<0.0056	<0.0056
MW-39	A	SITE E	2,4-Dimethylphenol	49	mg/L	2.6	1.9	2.65	1.97	2.18	1.36	2.29	0.838	1.08
MW-39	A	SITE E	1-Methyl naphthalene	3.1	mg/L	<0.051	<0.025	<0.022	0.0195	0.0122	0.0334	0.0145	0.0313	0.0445
MW-39	A	SITE E	2-Methyl naphthalene	9.8	mg/L	<0.051	<0.025	<0.026	0.0148	0.0084	0.0253	0.0118	0.0252	0.0363
MW-39	A	SITE E	Napthalene	49	mg/L	0.23	0.31	0.0752	0.147	0.0793	0.185	0.109	0.16	0.277
MW-39	A	SITE E	Pentachlorophenol	0.1	mg/L	<0.25	<0.1	0.0445	0.0308	0.0221	0.0123	0.0216	0.007	0.0098
MW-39	A	SITE E	Phenol	730	mg/L	<0.051	<0.025	<0.015	<0.0015	<0.003	<0.0059	<0.0059	<0.0059	<0.0059
MW-39	A	SITE E	Pyridine	2.4	mg/L	<0.051	<0.025	<0.02	<0.0020	<0.004	<0.017	<0.017	<0.0051	<0.0051
MW-39	A	SITE E	Arsenic	1	mg/L	0.0567	<0.2	0.0996	0.0612	0.0515	0.054	0.0925	0.0502	0.0486
MW-39	A	SITE E	Beryllium	0.4	mg/L	<0.004	<0.04	0.000049	<0.00011	<0.00064	<0.00064	<0.00064	<0.00064	<0.00064
MW-39	A	SITE E	Nickel	49	mg/L	0.0488	0.0621	0.0336	0.0405	0.046	0.0468	0.0392	0.0464	0.048
MW-39	A	SITE E	Selenium	5	mg/L	<0.005	<0.2	0.00093	<0.00083	0.0031	<0.0014	0.0028	0.0037	<0.0014
MW-39	A	SITE E	Vanadium	4.4	mg/L	<0.005	<0.05	0.0097	0.0062	0.0056	0.0059	0.0095	0.0054	0.0037
MW-39	A	SITE E	D. O.	na	mg/L	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-39	A	SITE E	ORP	na	mV	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-39	A	SITE E	pH	na	stnd unit	7.35	7.79	8.20	7.55	7.50	7.05	8.01	8.42	26.68
MW-39	A	SITE E	Specific Conductance	na	µmhos/cm	10,000	26,400	4,420	230	25,900	26,600	25,400	25	24,900
MW-39	A	SITE E	Temperature	na	oC	25.7	16.9	27.0	22.8	28.6	22.9	24.2	21.4	26.7
MW-39	A	SITE E	Turbidity	na	NTU	1.20	23.50	133.00	248.00	10.20	5.20	8.90	19.00	0.00
MW-39A	B	SITE E	Benzene	0.5	mg/L	0.27	0.29	0.326	0.241	0.236	0.208	0.296	0.252	0.304
MW-39A	B	SITE E	Benzenethiol	0.24	mg/L	<0.5	0.2900	4.5100	0.0457	0.1170	0.1260	0.1360	0.0898	0.0769
MW-39A	B	SITE E	Ethylbenzene	70	mg/L	0.17	0.16	0.32	0.174	0.134	0.145	0.305	0.171	0.191
MW-39A	B	SITE E	Toluene	100	mg/L	0.11	0.16	0.226	0.13	0.106	0.112	0.201	0.12	0.129

Table VI.B.3.b - GROUNDWATER MONITORING SYSTEM RESULTS - BICA and SITE E PROGRAMS

Alon USA LP - Big Spring Refinery

Well No.	Screen	Program	Constituent	$^{GW}GW_{Class3}$ (mg/L)	Units	CURRENT PERMIT ANALYSIS								
						Mar-15	Jul-15	Jan-16	Jul-16	Jan-17	Jul-17	Jan-18	Jul-18	Jan-19
MW-38A	B	SITE E	Pyridine	2.4	mg/L	na	na	na	na	na	na	na	na	na
MW-38A	B	SITE E	Arsenic	1	mg/L	na	na	na	na	na	na	na	na	na
MW-38A	B	SITE E	Beryllium	0.4	mg/L	na	na	na	na	na	na	na	na	na
MW-38A	B	SITE E	Nickel	49	mg/L	na	na	na	na	na	na	na	na	na
MW-38A	B	SITE E	Selenium	5	mg/L	na	na	na	na	na	na	na	na	na
MW-38A	B	SITE E	Vanadium	4.4	mg/L	na	na	na	na	na	na	na	na	na
MW-38A	B	SITE E	D. O.	na	mg/L	2.7	2.6	1.7	1.5	1.4	1.3	2.2	1.1	1.8
MW-38A	B	SITE E	ORP	na	mV	nm	nm	nm	(148.7)	(129.1)	(97.5)	(184.2)	(120.5)	(108.9)
MW-38A	B	SITE E	pH	na	stnd unit	6.71	6.78	6.87	6.68	6.73	6.83	6.94	6.72	6.80
MW-38A	B	SITE E	Specific Conductance	na	µmhos/cm	nm	nm	nm	nm	nm	nm	16,350	17,240	17,520
MW-38A	B	SITE E	Temperature	na	oC	nm	nm	nm	nm	nm	nm	18.5	27.6	19.1
MW-38A	B	SITE E	Turbidity	na	NTU	nm	nm	nm	nm	nm	nm	8.30	9.20	9.40
MW-39	A	SITE E	Benzene	0.5	mg/L	0.372	0.264	0.327	0.266	0.326	0.391	0.278	0.349	0.394
MW-39	A	SITE E	Benzenethiol	0.24	mg/L	0.0869	0.0996	0.0616	0.0525	0.081	0.849	0.0629	0.0575	0.0502
MW-39	A	SITE E	Ethylbenzene	70	mg/L	0.323	0.172	0.188	0.133	0.173	0.214	0.142	0.114	0.166
MW-39	A	SITE E	Toluene	100	mg/L	0.188	0.12	0.127	0.0828	0.117	0.135	0.0911	0.063	0.107
MW-39	A	SITE E	Xylenes, total	1000	mg/L	0.274	0.13	0.143	0.0911	0.14	0.147	0.102	0.0841	0.124
MW-39	A	SITE E	Acetone	2200	mg/L	na	na	na	na	na	na	na	na	na
MW-39	A	SITE E	Carbon disulfide	240	mg/L	na	na	na	na	na	na	na	na	na
MW-39	A	SITE E	Methyl ethyl Ketone	1500	mg/L	na	na	na	na	na	na	na	na	na
MW-39	A	SITE E	Cresols, totals	120	mg/L	na	na	na	na	na	na	na	na	na
MW-39	A	SITE E	Diethyl phthalate	2000	mg/L	na	na	na	na	na	na	na	na	na
MW-39	A	SITE E	2,4-Dimethylphenol	49	mg/L	na	na	na	na	na	na	na	na	na
MW-39	A	SITE E	1-Methyl naphthalene	3.1	mg/L	na	na	na	na	na	na	na	na	na
MW-39	A	SITE E	2-Methyl naphthalene	9.8	mg/L	na	na	na	na	na	na	na	na	na
MW-39	A	SITE E	Napthalene	49	mg/L	na	na	na	na	na	na	na	na	na
MW-39	A	SITE E	Pentachlorophenol	0.1	mg/L	na	na	na	na	na	na	na	na	na
MW-39	A	SITE E	Phenol	730	mg/L	na	na	na	na	na	na	na	na	na
MW-39	A	SITE E	Pyridine	2.4	mg/L	na	na	na	na	na	na	na	na	na
MW-39	A	SITE E	Arsenic	1	mg/L	na	na	na	na	na	na	na	na	na
MW-39	A	SITE E	Beryllium	0.4	mg/L	na	na	na	na	na	na	na	na	na
MW-39	A	SITE E	Nickel	49	mg/L	na	na	na	na	na	na	na	na	na
MW-39	A	SITE E	Selenium	5	mg/L	na	na	na	na	na	na	na	na	na
MW-39	A	SITE E	Vanadium	4.4	mg/L	na	na	na	na	na	na	na	na	na
MW-39	A	SITE E	D. O.	na	mg/L	1.6	1.5	1.3	1.7	1.9	2.1	2.7	2.6	1.5
MW-39	A	SITE E	ORP	na	mV	nm	nm	nm	(146.8)	(182.1)	(191.5)	(194.0)	(260.2)	(169.0)
MW-39	A	SITE E	pH	na	stnd unit	7.31	7.28	7.25	7.09	7.24	7.07	7.16	7.20	7.29
MW-39	A	SITE E	Specific Conductance	na	µmhos/cm	nm	nm	nm	nm	nm	nm	23,200	24,800	23,800
MW-39	A	SITE E	Temperature	na	oC	nm	nm	nm	nm	nm	nm	19.7	33.6	21.0
MW-39	A	SITE E	Turbidity	na	NTU	nm	nm	nm	nm	nm	nm	23.20	31.20	31.10
MW-39A	B	SITE E	Benzene	0.5	mg/L	0.328	0.111	0.124	0.137	0.137	0.138	0.119	0.159	0.145
MW-39A	B	SITE E	Benzenethiol	0.24	mg/L	0.0800	0.0821	0.1010	0.0447	0.0492	0.0759	0.0700	0.0734	0.0608
MW-39A	B	SITE E	Ethylbenzene	70	mg/L	0.181	0.0748	0.0935	0.0939	0.103	0.0879	0.0887	0.105	0.124
MW-39A	B	SITE E	Toluene	100	mg/L	0.116	0.0377	0.0454	0.0484	0.0518	0.05	0.0451	0.0532	0.0584

Table VI.B.3.b - GROUNDWATER MONITORING SYSTEM RESULTS - BICA and SITE E PROGRAMS

Alon USA LP - Big Spring Refinery

Well No.	Screen	Program	Constituent	$^{GW}GW_{Class3}$ (mg/L)	Units	CURRENT PERMIT ANALYSIS								
						Jul-19	Jan-20	Jul-20	Jan-21	Jul-21	Jan-22	Jul-22	Jan-23	Jul-23
MW-38A	B	SITE E	Pyridine	2.4	mg/L	na	na	na	na	<0.0011	na	<0.0011	<0.0037	na
MW-38A	B	SITE E	Arsenic	1	mg/L	na	na	na	na	0.0507	na	0.0479	0.0742	na
MW-38A	B	SITE E	Beryllium	0.4	mg/L	na	na	na	na	<0.0005	na	<0.005	<0.0038	na
MW-38A	B	SITE E	Nickel	49	mg/L	na	na	na	na	0.0403	na	0.0335	0.0372	na
MW-38A	B	SITE E	Selenium	5	mg/L	na	na	na	na	<0.00097	na	<0.005	0.0140	na
MW-38A	B	SITE E	Vanadium	4.4	mg/L	na	na	na	na	0.0024	na	0.0020	0.0046	na
MW-38A	B	SITE E	D. O.	na	mg/L	2.1	2.1	1.3	1.3	1.4	1.5	1.4	1.9	1.7
MW-38A	B	SITE E	ORP	na	mV	(104.9)	24.1	(120.1)	(120.1)	(102.1)	(104.0)	(82.5)	(116.9)	165.3
MW-38A	B	SITE E	pH	na	stnd unit	6.78	6.71	6.64	6.64	6.68	6.67	7.06	6.66	6.68
MW-38A	B	SITE E	Specific Conductance	na	µmhos/cm	17,200	18,000	33,400	33,400	27,600	27,300	26,200	19,500	21,100
MW-38A	B	SITE E	Temperature	na	oC	27.4	20.0	24.8	24.8	20.9	22.7	24.4	16.9	24.4
MW-38A	B	SITE E	Turbidity	na	NTU	9.00	8.70	8.50	8.50	4.80	8.60	8.00	8.70	8.60
MW-39	A	SITE E	Benzene	0.5	mg/L	0.289	0.2620	0.2600	0.2600	0.2170	0.1750	0.1530	0.0887	0.0613
MW-39	A	SITE E	Benzenethiol	0.24	mg/L	0.0708	0.0584	0.0683	0.0683	0.0882	0.5010	0.0614	0.0341	0.3450
MW-39	A	SITE E	Ethylbenzene	70	mg/L	0.121	0.1380	0.1480	0.1480	0.1380	0.1210	0.1850	0.1370	0.1020
MW-39	A	SITE E	Toluene	100	mg/L	0.0737	0.0674	0.0644	0.0644	0.0478	0.0403	0.0570	0.0428	0.0421
MW-39	A	SITE E	Xylenes, total	1000	mg/L	0.0857	0.0962	0.0944	0.0944	0.0823	0.0833	0.1050	0.0777	0.0616
MW-39	A	SITE E	Acetone	2200	mg/L	na	na	na	na	<0.10	na	0.0234	0.0226	na
MW-39	A	SITE E	Carbon disulfide	240	mg/L	na	na	na	na	<0.010	na	<0.00027	0.00062	na
MW-39	A	SITE E	Methyl ethyl Ketone	1500	mg/L	na	na	na	na	<0.017	na	0.0043	<0.00078	na
MW-39	A	SITE E	Cresols, totals	120	mg/L	na	na	na	na	0.0184	na	<0.000027	0.0022	na
MW-39	A	SITE E	Diethyl phthalate	2000	mg/L	na	na	na	na	<0.001	na	<0.000072	<0.00046	na
MW-39	A	SITE E	2,4-Dimethylphenol	49	mg/L	na	na	na	na	0.2900	na	0.3050	0.0531	na
MW-39	A	SITE E	1-Methyl naphthalene	3.1	mg/L	na	na	na	na	0.0393	na	0.0202	0.0443	na
MW-39	A	SITE E	2-Methyl naphthalene	9.8	mg/L	na	na	na	na	0.0027	na	0.0137	<0.00032	na
MW-39	A	SITE E	Napthalene	49	mg/L	na	na	na	na	<0.0011	na	0.4490	<0.00027	na
MW-39	A	SITE E	Pentachlorophenol	0.1	mg/L	na	na	na	na	0.0046	na	0.0028	<0.0047	na
MW-39	A	SITE E	Phenol	730	mg/L	na	na	na	na	0.0016	na	<0.000027	<0.0004	na
MW-39	A	SITE E	Pyridine	2.4	mg/L	na	na	na	na	<0.001	na	<0.0010	<0.0037	na
MW-39	A	SITE E	Arsenic	1	mg/L	na	na	na	na	0.0370	na	0.0472	0.2280	na
MW-39	A	SITE E	Beryllium	0.4	mg/L	na	na	na	na	<0.0005	na	<0.001	<0.0038	na
MW-39	A	SITE E	Nickel	49	mg/L	na	na	na	na	0.0295	na	0.0222	0.0128	na
MW-39	A	SITE E	Selenium	5	mg/L	na	na	na	na	0.0008	na	<0.005	<0.014	na
MW-39	A	SITE E	Vanadium	4.4	mg/L	na	na	na	na	0.0212	na	0.0194	0.0168	na
MW-39	A	SITE E	D. O.	na	mg/L	1.7	1.2	1.0	1.0	1.6	1.7	1.1	1.9	1.7
MW-39	A	SITE E	ORP	na	mV	(165.0)	(81.4)	(227.9)	(227.9)	(135.4)	(132.0)	(169.3)	(188.3)	(220.3)
MW-39	A	SITE E	pH	na	stnd unit	7.32	7.31	7.56	7.56	7.84	7.79	8.15	7.82	7.92
MW-39	A	SITE E	Specific Conductance	na	µmhos/cm	22,000	16,760	16,740	16,740	11,820	11,870	14,800	7,010	7,800
MW-39	A	SITE E	Temperature	na	oC	24.1	20.8	26.5	26.5	18.6	21.0	26.9	14.6	31.2
MW-39	A	SITE E	Turbidity	na	NTU	31.60	56.00	36.40	36.40	31.40	35.10	35.90	39.10	39.50
MW-39A	B	SITE E	Benzene	0.5	mg/L	0.148	0.1400	0.1650	0.1650	0.1540	0.1740	0.1550	0.1600	0.1370
MW-39A	B	SITE E	Benzenethiol	0.24	mg/L	0.0778	0.0682	0.0268	0.0268	0.0290	0.0606	0.0375	0.0150	0.0368
MW-39A	B	SITE E	Ethylbenzene	70	mg/L	0.14	0.1230	0.1390	0.1390	0.1040	0.1030	0.0979	0.0992	0.0739
MW-39A	B	SITE E	Toluene	100	mg/L	0.0596	0.0631	0.0526	0.0526	0.0474	0.0443	0.0331	0.0355	0.0316

Table VI.B.3.b - GROUNDWATER MONITORING SYSTEM RESULTS - BICA and SITE E PROGRAMS

Alon USA LP - Big Spring Refinery

Well No.	Screen	Program	Constituent	$^{GW}GW_{Class3}$ (mg/L)	Units	PRE-PERMIT ANALYSIS								
						Jul-10	Jan-11	Jul-11	Jan-12	Jul-12	Jan-13	Jul-13	Jan-14	Jul-14
MW-39A	B	SITE E	Xylenes, total	1000	mg/L	0.151	0.161	0.305	0.163	0.127	0.145	0.309	0.175	0.203
MW-39A	B	SITE E	Acetone	2200	mg/L	<0.012	<0.1	0.0183	<0.01	<0.01	<0.010	0.0323	0.0142	0.0102
MW-39A	B	SITE E	Carbon disulfide	240	mg/L	<0.005	<0.005	<0.00036	0.0025	0.0011	0.0014	0.0019	0.0022	0.0019
MW-39A	B	SITE E	Methyl ethyl Ketone	1500	mg/L	0.023	<0.1	0.0028	<0.0018	<0.0018	0.0046	0.0082	0.0033	0.0028
MW-39A	B	SITE E	Cresols, totals	120	mg/L	0.1	0.077	0.149	0.0277	0.0872	0.0159	0.134	0.0779	0.0738
MW-39A	B	SITE E	Diethyl phthalate	2000	mg/L	<0.05	<0.02	<0.022	<0.0023	<0.0043	<0.0061	<0.0061	<0.0063	<0.0056
MW-39A	B	SITE E	2,4-Dimethylphenol	49	mg/L	2	3.6	2.59	2.12	2.79	1.81	1.7	0.782	1.83
MW-39A	B	SITE E	1-Methyl naphthalene	3.1	mg/L	<0.05	<0.02	0.0325	0.0058	0.161	0.0123	0.0472	0.0145	0.0126
MW-39A	B	SITE E	2-Methyl naphthalene	9.8	mg/L	<0.05	<0.02	<0.026	0.0054	<0.0052	0.0088	0.0395	0.0116	0.0085
MW-39A	B	SITE E	Napthalene	49	mg/L	0.098	0.099	0.326	0.07	0.0838	0.0876	0.252	0.0744	0.118
MW-39A	B	SITE E	Pentachlorophenol	0.1	mg/L	<0.25	<0.1	0.0418	0.0329	0.0193	0.0138	0.014	0.0147	0.0169
MW-39A	B	SITE E	Phenol	730	mg/L	<0.05	<0.02	<0.015	<0.0016	<0.0030	<0.0059	<0.0059	<0.0067	<0.0059
MW-39A	B	SITE E	Pyridine	2.4	mg/L	<0.05	<0.02	<0.02	<0.0021	<0.0040	<0.017	<0.017	<0.0058	<0.0051
MW-39A	B	SITE E	Arsenic	1.0	mg/L	0.0695	<0.2	0.0727	0.0906	0.096	0.0859	0.0585	0.0867	0.0931
MW-39A	B	SITE E	Beryllium	0.4	mg/L	<0.004	<0.04	0.000042	<0.00011	<0.00064	<0.00064	<0.00064	<0.00064	<0.00064
MW-39A	B	SITE E	Nickel	49	mg/L	0.0369	0.0583	0.0376	0.0343	0.0354	0.037	0.045	0.0388	0.0423
MW-39A	B	SITE E	Selenium	5.0	mg/L	<0.005	<0.2	0.00077	<0.00083	0.0037	0.0016	0.0017	0.0049	0.0021
MW-39A	B	SITE E	Vanadium	4.4	mg/L	0.0057	<0.05	0.0058	<0.01	0.0093	0.0099	0.0059	0.0088	0.0073
MW-39A	B	SITE E	D. O.	na	mg/L	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-39A	B	SITE E	ORP	na	mV	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-39A	B	SITE E	pH	na	stnd unit	7.09	7.43	8.74	7.45	8.11	6.97	7.79	6.86	7.11
MW-39A	B	SITE E	Specific Conductance	na	µmhos/cm	73,100	51,200	8	49,300	44,100	47,500	51,400	50	38,900
MW-39A	B	SITE E	Temperature	na	oC	25.3	21.2	25.9	23.2	25.9	23.4	24.2	23.0	26.4
MW-39A	B	SITE E	Turbidity	na	NTU	65.80	11.00	NR	5.70	0.00	12.80	6.60	0.00	0.00
MW-40	A	SITE E	Benzene	0.5	mg/L	0.38	0.24	0.274	0.214	0.215	0.172	0.198	0.193	0.18
MW-40	A	SITE E	Benzenethiol	0.24	mg/L	<0.54	<0.2	0.204	0.0663	0.0783	0.112	0.18	0.15	0.115
MW-40	A	SITE E	Ethylbenzene	70	mg/L	0.16	0.1	0.105	0.102	0.12	0.102	0.148	0.129	0.154
MW-40	A	SITE E	Toluene	100	mg/L	0.21	0.12	0.141	0.112	0.118	0.0977	0.112	0.0845	0.073
MW-40	A	SITE E	Xylenes, total	1000	mg/L	0.232	0.149	0.19	0.14	0.159	0.127	0.156	0.102	0.103
MW-40	A	SITE E	Acetone	2200	mg/L	<0.012	<0.1	0.0224	<0.01	<0.010	<0.010	0.0153	0.023	0.0134
MW-40	A	SITE E	Carbon disulfide	240	mg/L	<0.005	<0.005	0.00092	0.0016	0.00073	0.00073	0.00095	0.00075	0.00048
MW-40	A	SITE E	Methyl ethyl Ketone	1500	mg/L	<0.012	<0.1	0.0021	<0.0018	0.0021	0.0036	<0.0027	0.0057	0.0035
MW-40	A	SITE E	Cresols, totals	120	mg/L	1.1	0.55	0.248	0.0847	0.0891	0.0648	0.1709	0.1933	0.1223
MW-40	A	SITE E	Diethyl phthalate	2000	mg/L	<0.054	<0.02	<0.022	<0.0022	<0.0043	<0.0061	<0.0061	<0.0058	<0.0056
MW-40	A	SITE E	2,4-Dimethylphenol	49	mg/L	8.8	6.9	4.20	3.67	3.73	2.78	3.23	2.22	2.31
MW-40	A	SITE E	1-Methyl naphthalene	3.1	mg/L	<0.054	0.044	0.0567	0.0408	0.0534	0.0466	0.0555	0.0684	0.516
MW-40	A	SITE E	2-Methyl naphthalene	9.8	mg/L	<0.054	0.028	<0.026	0.0118	0.0154	0.0073	<0.0048	<0.0052	0.005
MW-40	A	SITE E	Napthalene	49	mg/L	0.23	0.22	0.167	0.0953	0.135	0.0827	0.0629	0.0499	0.0377
MW-40	A	SITE E	Pentachlorophenol	0.1	mg/L	<0.27	<0.1	0.0665	0.0443	0.0335	0.0164	0.0194	0.0129	0.0132
MW-40	A	SITE E	Phenol	730	mg/L	<0.054	<0.02	<0.015	<0.0016	<0.0030	<0.0059	<0.0059	<0.0061	<0.0059
MW-40	A	SITE E	Pyridine	2.4	mg/L	<0.054	<0.02	<0.02	<0.0020	<0.0040	<0.017	<0.017	<0.0053	<0.0051
MW-40	A	SITE E	Arsenic	1.0	mg/L	0.103	<0.2	0.0797	0.066	0.0781	0.0708	0.0729	0.0703	0.0669
MW-40	A	SITE E	Beryllium	0.4	mg/L	<0.005	<0.04	0.00014	<.001	<0.00064	<0.00064	<0.00064	<0.00064	<0.00064
MW-40	A	SITE E	Nickel	49	mg/L	0.0896	0.101	0.0828	0.0752	0.0896	0.0786	0.0708	0.0598	0.0542

Table VI.B.3.b - GROUNDWATER MONITORING SYSTEM RESULTS - BICA and SITE E PROGRAMS

Alon USA LP - Big Spring Refinery

Well No.	Screen	Program	Constituent	$^{GW}GW_{Class3}$ (mg/L)	Units	CURRENT PERMIT ANALYSIS								
						Mar-15	Jul-15	Jan-16	Jul-16	Jan-17	Jul-17	Jan-18	Jul-18	Jan-19
MW-39A	B	SITE E	Xylenes, total	1000	mg/L	0.177	0.0709	0.0863	0.0815	0.0979	0.0795	0.0758	0.0923	0.11
MW-39A	B	SITE E	Acetone	2200	mg/L	na	na	na	na	na	na	na	na	na
MW-39A	B	SITE E	Carbon disulfide	240	mg/L	na	na	na	na	na	na	na	na	na
MW-39A	B	SITE E	Methyl ethyl Ketone	1500	mg/L	na	na	na	na	na	na	na	na	na
MW-39A	B	SITE E	Cresols, totals	120	mg/L	na	na	na	na	na	na	na	na	na
MW-39A	B	SITE E	Diethyl phthalate	2000	mg/L	na	na	na	na	na	na	na	na	na
MW-39A	B	SITE E	2,4-Dimethylphenol	49	mg/L	na	na	na	na	na	na	na	na	na
MW-39A	B	SITE E	1-Methyl naphthalene	3.1	mg/L	na	na	na	na	na	na	na	na	na
MW-39A	B	SITE E	2-Methyl naphthalene	9.8	mg/L	na	na	na	na	na	na	na	na	na
MW-39A	B	SITE E	Napthalene	49	mg/L	na	na	na	na	na	na	na	na	na
MW-39A	B	SITE E	Pentachlorophenol	0.1	mg/L	na	na	na	na	na	na	na	na	na
MW-39A	B	SITE E	Phenol	730	mg/L	na	na	na	na	na	na	na	na	na
MW-39A	B	SITE E	Pyridine	2.4	mg/L	na	na	na	na	na	na	na	na	na
MW-39A	B	SITE E	Arsenic	1.0	mg/L	na	na	na	na	na	na	na	na	na
MW-39A	B	SITE E	Beryllium	0.4	mg/L	na	na	na	na	na	na	na	na	na
MW-39A	B	SITE E	Nickel	49	mg/L	na	na	na	na	na	na	na	na	na
MW-39A	B	SITE E	Selenium	5.0	mg/L	na	na	na	na	na	na	na	na	na
MW-39A	B	SITE E	Vanadium	4.4	mg/L	na	na	na	na	na	na	na	na	na
MW-39A	B	SITE E	D. O.	na	mg/L	6.9	1.2	1.2	1.3	1.3	1.6	1.6	1.3	1.5
MW-39A	B	SITE E	ORP	na	mV	nm	nm	nm	(104.5)	(126.0)	(101.5)	(104.7)	(185.6)	(94.1)
MW-39A	B	SITE E	pH	na	stnd unit	7.04	6.60	6.53	6.60	6.66	6.50	6.64	6.46	6.52
MW-39A	B	SITE E	Specific Conductance	na	µmhos/cm	nm	nm	nm	nm	nm	nm	75,100	75,600	81,100
MW-39A	B	SITE E	Temperature	na	oC	nm	nm	nm	nm	nm	nm	21.2	27.6	22.3
MW-39A	B	SITE E	Turbidity	na	NTU	nm	nm	nm	nm	nm	nm	7.80	3.70	9.00
MW-40	A	SITE E	Benzene	0.5	mg/L	0.164	0.197	0.196	0.189	0.189	0.172	0.158	0.205	0.172
MW-40	A	SITE E	Benzenethiol	0.24	mg/L	0.0663	0.173	0.178	0.0967	0.0851	0.173	0.149	0.153	0.101
MW-40	A	SITE E	Ethylbenzene	70	mg/L	0.161	0.113	0.147	0.151	0.14	0.12	0.11	0.156	0.131
MW-40	A	SITE E	Toluene	100	mg/L	0.0652	0.0745	0.0746	0.0751	0.0646	0.054	0.0462	0.0614	0.0661
MW-40	A	SITE E	Xylenes, total	1000	mg/L	0.111	0.0851	0.0988	0.0942	0.0967	0.0755	0.0649	0.0981	0.117
MW-40	A	SITE E	Acetone	2200	mg/L	na	na	na	na	na	na	na	na	na
MW-40	A	SITE E	Carbon disulfide	240	mg/L	na	na	na	na	na	na	na	na	na
MW-40	A	SITE E	Methyl ethyl Ketone	1500	mg/L	na	na	na	na	na	na	na	na	na
MW-40	A	SITE E	Cresols, totals	120	mg/L	na	na	na	na	na	na	na	na	na
MW-40	A	SITE E	Diethyl phthalate	2000	mg/L	na	na	na	na	na	na	na	na	na
MW-40	A	SITE E	2,4-Dimethylphenol	49	mg/L	na	na	na	na	na	na	na	na	na
MW-40	A	SITE E	1-Methyl naphthalene	3.1	mg/L	na	na	na	na	na	na	na	na	na
MW-40	A	SITE E	2-Methyl naphthalene	9.8	mg/L	na	na	na	na	na	na	na	na	na
MW-40	A	SITE E	Napthalene	49	mg/L	na	na	na	na	na	na	na	na	na
MW-40	A	SITE E	Pentachlorophenol	0.1	mg/L	na	na	na	na	na	na	na	na	na
MW-40	A	SITE E	Phenol	730	mg/L	na	na	na	na	na	na	na	na	na
MW-40	A	SITE E	Pyridine	2.4	mg/L	na	na	na	na	na	na	na	na	na
MW-40	A	SITE E	Arsenic	1.0	mg/L	na	na	na	na	na	na	na	na	na
MW-40	A	SITE E	Beryllium	0.4	mg/L	na	na	na	na	na	na	na	na	na
MW-40	A	SITE E	Nickel	49	mg/L	na	na	na	na	na	na	na	na	na

Table VI.B.3.b - GROUNDWATER MONITORING SYSTEM RESULTS - BICA and SITE E PROGRAMS

Alon USA LP - Big Spring Refinery

Well No.	Screen	Program	Constituent	$^{GW}GW_{Class3}$ (mg/L)	Units	CURRENT PERMIT ANALYSIS								
						Jul-19	Jan-20	Jul-20	Jan-21	Jul-21	Jan-22	Jul-22	Jan-23	Jul-23
MW-39A	B	SITE E	Xylenes, total	1000	mg/L	0.116	0.1050	0.0956	0.0956	0.0660	0.0734	0.0530	0.0542	0.0420
MW-39A	B	SITE E	Acetone	2200	mg/L	na	na	na	ns	<0.10	na	<0.0011	0.0123	na
MW-39A	B	SITE E	Carbon disulfide	240	mg/L	na	na	na	ns	<0.010	na	<0.00027	0.0012	na
MW-39A	B	SITE E	Methyl ethyl Ketone	1500	mg/L	na	na	na	ns	<0.017	na	0.0180	0.0152	na
MW-39A	B	SITE E	Cresols, totals	120	mg/L	na	na	na	ns	0.0698	na	0.0684	0.0514	na
MW-39A	B	SITE E	Diethyl phthalate	2000	mg/L	na	na	na	ns	<0.001	na	0.0088	<0.00046	na
MW-39A	B	SITE E	2,4-Dimethylphenol	49	mg/L	na	na	na	ns	0.2940	na	0.1080	0.1070	na
MW-39A	B	SITE E	1-Methyl naphthalene	3.1	mg/L	na	na	na	ns	0.0280	na	0.0278	0.0225	na
MW-39A	B	SITE E	2-Methyl naphthalene	9.8	mg/L	na	na	na	ns	0.0255	na	0.0266	0.0208	na
MW-39A	B	SITE E	Napthalene	49	mg/L	na	na	na	ns	0.0941	na	0.0846	0.0883	na
MW-39A	B	SITE E	Pentachlorophenol	0.1	mg/L	na	na	na	ns	0.0035	na	0.0018	<0.0047	na
MW-39A	B	SITE E	Phenol	730	mg/L	na	na	na	ns	<0.0011	na	<0.000028	<0.0004	na
MW-39A	B	SITE E	Pyridine	2.4	mg/L	na	na	na	ns	<0.0011	na	<0.0011	<0.0037	na
MW-39A	B	SITE E	Arsenic	1.0	mg/L	na	na	na	ns	0.0570	na	0.0790	0.0853	na
MW-39A	B	SITE E	Beryllium	0.4	mg/L	na	na	na	ns	<0.002	na	<0.005	<0.015	na
MW-39A	B	SITE E	Nickel	49	mg/L	na	na	na	ns	0.0232	na	0.0278	0.0327	na
MW-39A	B	SITE E	Selenium	5.0	mg/L	na	na	na	ns	0.0014	na	<0.025	<0.056	na
MW-39A	B	SITE E	Vanadium	4.4	mg/L	na	na	na	ns	0.0019	na	<0.005	<0.0072	na
MW-39A	B	SITE E	D. O.	na	mg/L	1.6	1.6	2.0	2.0	1.2	1.4	1.1	2.1	1.7
MW-39A	B	SITE E	ORP	na	mV	(97.5)	(67.4)	(118.8)	(118.8)	(86.2)	(50.2)	(66.7)	(130.9)	(104.9)
MW-39A	B	SITE E	pH	na	stnd unit	6.54	6.40	6.37	6.37	6.42	6.77	7.02	6.24	6.37
MW-39A	B	SITE E	Specific Conductance	na	µmhos/cm	83,600	82,500	57,900	57,900	110,900	100,500	92,500	96,400	118,900
MW-39A	B	SITE E	Temperature	na	oC	25.8	22.2	27.4	27.4	21.5	22.8	27.2	19.5	27.9
MW-39A	B	SITE E	Turbidity	na	NTU	9.00	9.00	8.90	8.90	8.90	8.90	7.90	8.10	7.90
MW-40	A	SITE E	Benzene	0.5	mg/L	0.204	0.1890	0.2390	0.2390	0.4050	0.3660	0.2940	0.3670	0.3280
MW-40	A	SITE E	Benzenethiol	0.24	mg/L	0.104	0.0880	0.0891	0.0891	0.1160	0.1290	0.0591	0.0771	0.1550
MW-40	A	SITE E	Ethylbenzene	70	mg/L	0.178	0.1190	0.1460	0.1460	0.2250	0.1610	0.1240	0.1580	0.1320
MW-40	A	SITE E	Toluene	100	mg/L	0.0778	0.0661	0.0912	0.0912	0.2960	0.1640	0.1350	0.1870	0.1720
MW-40	A	SITE E	Xylenes, total	1000	mg/L	0.11	0.0837	0.1060	0.1060	0.2640	0.1540	0.1190	0.1680	0.1550
MW-40	A	SITE E	Acetone	2200	mg/L	na	na	na	ns	<0.10	na	<0.0057	0.0167	na
MW-40	A	SITE E	Carbon disulfide	240	mg/L	na	na	na	ns	<0.010	na	<0.0014	<0.0014	na
MW-40	A	SITE E	Methyl ethyl Ketone	1500	mg/L	na	na	na	ns	<0.017	na	<0.0039	<0.0039	na
MW-40	A	SITE E	Cresols, totals	120	mg/L	na	na	na	ns	0.0346	na	0.0153	0.0485	na
MW-40	A	SITE E	Diethyl phthalate	2000	mg/L	na	na	na	ns	<0.001	na	<0.000072	<0.00046	na
MW-40	A	SITE E	2,4-Dimethylphenol	49	mg/L	na	na	na	ns	3.1600	na	4.4200	5.3700	na
MW-40	A	SITE E	1-Methyl naphthalene	3.1	mg/L	na	na	na	ns	0.0416	na	0.0640	<0.00026	na
MW-40	A	SITE E	2-Methyl naphthalene	9.8	mg/L	na	na	na	ns	0.0029	na	<0.00006	<0.00032	na
MW-40	A	SITE E	Napthalene	49	mg/L	na	na	na	ns	0.0764	na	0.0107	<0.00027	na
MW-40	A	SITE E	Pentachlorophenol	0.1	mg/L	na	na	na	ns	0.0229	na	0.0186	0.0335	na
MW-40	A	SITE E	Phenol	730	mg/L	na	na	na	ns	0.0019	na	<0.000027	<0.0004	na
MW-40	A	SITE E	Pyridine	2.4	mg/L	na	na	na	ns	<0.001	na	<0.001	<0.0037	na
MW-40	A	SITE E	Arsenic	1.0	mg/L	na	na	na	ns	0.1030	na	0.0826	0.0765	na
MW-40	A	SITE E	Beryllium	0.4	mg/L	na	na	na	ns	<0.0005	na	<0.001	<0.0038	na
MW-40	A	SITE E	Nickel	49	mg/L	na	na	na	ns	0.0480	na	0.0437	0.0520	na

Table VI.B.3.b - GROUNDWATER MONITORING SYSTEM RESULTS - BICA and SITE E PROGRAMS

Alon USA LP - Big Spring Refinery

Well No.	Screen	Program	Constituent	$^{GW}GW_{Class3}$ (mg/L)	Units	PRE-PERMIT ANALYSIS								
						Jul-10	Jan-11	Jul-11	Jan-12	Jul-12	Jan-13	Jul-13	Jan-14	Jul-14
MW-40	A	SITE E	Selenium	5.0	mg/L	<0.01	<0.2	0.00089	<.001	<0.0027	<0.0014	<0.0014	0.003	<0.0014
MW-40	A	SITE E	Vanadium	4.4	mg/L	<0.005	<0.05	0.0032	0.0032	0.0031	0.0039	0.0041	0.0037	0.0014
MW-40	A	SITE E	D. O.	na	mg/L	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-40	A	SITE E	ORP	na	mV	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-40	A	SITE E	pH	na	stnd unit	6.46	7.18	6.65	6.74	6.47	6.55	7.64	6.66	6.74
MW-40	A	SITE E	Specific Conductance	na	µmhos/cm	19,340	16,000	17,200	15,600	17,400	17,700	16,700	16,200	15,200
MW-40	A	SITE E	Temperature	na	oC	22.0	18.6	27.6	19.6	23.2	19.8	17.5	21.0	24.3
MW-40	A	SITE E	Turbidity	na	NTU	0.00	18.60	110.00	0.00	22.30	10.30	20.80	0.50	0.00
MW-40A	B	SITE E	Benzene	0.5	mg/L	0.37	0.27	0.297	0.378	0.352	0.258	0.398	0.417	0.488
MW-40A	B	SITE E	Benzenethiol	0.24	mg/L	<0.5	<0.21	0.197	0.0356	0.0569	0.111	0.163	0.109	0.179
MW-40A	B	SITE E	Ethylbenzene	70	mg/L	0.2	0.14	0.135	0.21	0.2	0.157	0.232	0.235	0.258
MW-40A	B	SITE E	Toluene	100	mg/L	0.33	0.21	0.178	0.369	0.322	0.181	0.35	0.373	0..393
MW-40A	B	SITE E	Xylenes, total	1000	mg/L	0.241	0.154	0.179	0.282	0.278	0.198	0.338	0.285	0.372
MW-40A	B	SITE E	Acetone	2200	mg/L	<0.012	<0.1	0.0199	<0.01	0.0161	0.0191	0.0267	0.0261	0.013
MW-40A	B	SITE E	Carbon disulfide	240	mg/L	<0.005	<0.005	0.005	0.0045	0.0045	0.0038	0.0034	0.0041	0.0022
MW-40A	B	SITE E	Methyl ethyl Ketone	1500	mg/L	<0.012	<0.1	0.0036	<0.0018	0.0032	0.0089	0.0072	0.0076	0.0035
MW-40A	B	SITE E	Cresols, totals	120	mg/L	0.162	0.164	0.1452	0.0461	0.0553	0.0534	0.0841	0.0966	0.0616
MW-40A	B	SITE E	Diethyl phthalate	2000	mg/L	<0.05	<0.021	<0.022	<0.0022	<0.0043	0.01	<0.0061	<0.0056	<0.0056
MW-40A	B	SITE E	2,4-Dimethylphenol	49	mg/L	4	3.2	2.9	4.15	3.7	3.02	4.81	3.79	5.75
MW-40A	B	SITE E	1-Methyl naphthalene	3.1	mg/L	<0.05	0.026	0.248	0.0174	0.0271	0.0237	0.025	0.0263	0.0277
MW-40A	B	SITE E	2-Methyl naphthalene	9.8	mg/L	<0.05	0.025	<0.026	0.0159	0.0242	0.0202	0.0247	0.025	0.0239
MW-40A	B	SITE E	Napthalene	49	mg/L	0.12	0.19	0.137	0.117	0.151	0.128	0.153	0.124	0.174
MW-40A	B	SITE E	Pentachlorophenol	0.1	mg/L	<0.25	<0.1	0.0555	0.0474	0.0301	0.0222	0.0344	0.0241	0.0374
MW-40A	B	SITE E	Phenol	730	mg/L	<0.05	<0.021	<0.015	<0.0015	<0.0030	<0.0059	<0.0059	<0.0059	<0.0059
MW-40A	B	SITE E	Pyridine	2.4	mg/L	<0.05	<0.021	<0.02	<0.002	<0.0040	<0.017	<0.017	<0.0051	<0.0051
MW-40A	B	SITE E	Arsenic	1.0	mg/L	0.122	<0.2	0.073	0.0914	0.102	0.0755	0.099	0.0929	0.101
MW-40A	B	SITE E	Beryllium	0.4	mg/L	<0.005	<0.04	0.00006	<0.00011	<0.0013	<0.00064	<0.00064	<0.00064	<0.00064
MW-40A	B	SITE E	Nickel	49	mg/L	0.0309	0.0696	0.0263	0.0344	0.0419	0.0386	0.0406	0.0376	0.041
MW-40A	B	SITE E	Selenium	5.0	mg/L	0.0116	<0.4	0.00087	<0.00083	0.0054	0.0032	0.009	0.0105	<0.0014
MW-40A	B	SITE E	Vanadium	4.4	mg/L	<0.005	<0.05	0.0047	<0.01	0.0051	0.006	0.0066	0.0059	0.0033
MW-40A	B	SITE E	D. O.	na	mg/L	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-40A	B	SITE E	ORP	na	mV	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-40A	B	SITE E	pH	na	stnd unit	6.57	7.25	6.48	6.84	6.53	5.71	7.70	6.69	6.95
MW-40A	B	SITE E	Specific Conductance	na	µmhos/cm	66,290	63,500	75,900	56,300	61,500	76,100	56,200	67,500	42,500
MW-40A	B	SITE E	Temperature	na	oC	30.2	18.8	26.1	19.6	22.9	22.0	21.9	20.9	23.8
MW-40A	B	SITE E	Turbidity	na	NTU	0.00	8.24	37.20	76.10	6.00	0.00	8.50	0.00	0.00
MW-41	A	SITE E	Benzene	0.5	mg/L	0.22	0.16	0.109	0.184	DRY	0.25	0.249	0.244	0.31
MW-41	A	SITE E	Benzenethiol	0.24	mg/L	<0.051	<0.2	0.0743	0.0674	DRY	0.0928	0.1710	0.1980	0.1570
MW-41	A	SITE E	Ethylbenzene	70	mg/L	0.29	0.24	0.0953	0.24	DRY	0.323	0.309	0.273	0.356
MW-41	A	SITE E	Toluene	100	mg/L	0.057	0.048	0.0192	0.0448	DRY	0.0465	0.0552	0.5	0.0554
MW-41	A	SITE E	Xylenes, total	1000	mg/L	0.202	0.186	0.0835	0.22	DRY	0.309	0.291	0.23	0.334
MW-41	A	SITE E	Acetone	2200	mg/L	<0.012	<0.1	0.0157	<0.010	DRY	<0.010	0.0165	0.0196	0.0212
MW-41	A	SITE E	Carbon disulfide	240	mg/L	<0.005	<0.005	<0.00036	<0.001	DRY	<0.00036	<0.00036	<0.00036	<0.00036
MW-41	A	SITE E	Methyl ethyl Ketone	1500	mg/L	<0.012	<0.1	.<0.0018	0.0051	DRY	0.0041	0.0001	0.0054	0.0058

Table VI.B.3.b - GROUNDWATER MONITORING SYSTEM RESULTS - BICA and SITE E PROGRAMS

Alon USA LP - Big Spring Refinery

Well No.	Screen	Program	Constituent	$^{GW}GW_{Class3}$ (mg/L)	Units	CURRENT PERMIT ANALYSIS								
						Mar-15	Jul-15	Jan-16	Jul-16	Jan-17	Jul-17	Jan-18	Jul-18	Jan-19
MW-40	A	SITE E	Selenium	5.0	mg/L	na	na	na	na	na	na	na	na	na
MW-40	A	SITE E	Vanadium	4.4	mg/L	na	na	na	na	na	na	na	na	na
MW-40	A	SITE E	D. O.	na	mg/L	2.0	2.3	2.0	2.3	2.5	2.1	1.9	1.9	1.7
MW-40	A	SITE E	ORP	na	mV	nm	nm	nm	(158.7)	(161.5)	(173.8)	(218.1)	(150.3)	(147.0)
MW-40	A	SITE E	pH	na	stnd unit	6.76	6.90	6.89	6.91	6.87	6.90	6.81	6.82	6.78
MW-40	A	SITE E	Specific Conductance	na	µmhos/cm	nm	nm	nm	nm	nm	nm	13,400	14,560	14,800
MW-40	A	SITE E	Temperature	na	oC	nm	nm	nm	nm	nm	nm	20.7	23.0	20.1
MW-40	A	SITE E	Turbidity	na	NTU	nm	nm	nm	nm	nm	nm	9.50	9.20	8.20
MW-40A	B	SITE E	Benzene	0.5	mg/L	0.432	0.382	0.448	0.467	0.443	0.324	0.384	0.453	0.429
MW-40A	B	SITE E	Benzenethiol	0.24	mg/L	0.0952	0.29	0.254	0.0668	0.0898	0.89	0.178	0.11	0.0869
MW-40A	B	SITE E	Ethylbenzene	70	mg/L	0.284	0.191	0.239	0.232	0.244	0.175	0.223	0.226	0.197
MW-40A	B	SITE E	Toluene	100	mg/L	0.431	0.323	0.379	0.401	0.403	0.282	0.349	0.365	0.322
MW-40A	B	SITE E	Xylenes, total	1000	mg/L	0.365	0.284	0.295	0.259	0.289	0.214	0.274	0.291	0.255
MW-40A	B	SITE E	Acetone	2200	mg/L	na	na	na	na	na	na	na	na	na
MW-40A	B	SITE E	Carbon disulfide	240	mg/L	na	na	na	na	na	na	na	na	na
MW-40A	B	SITE E	Methyl ethyl Ketone	1500	mg/L	na	na	na	na	na	na	na	na	na
MW-40A	B	SITE E	Cresols, totals	120	mg/L	na	na	na	na	na	na	na	na	na
MW-40A	B	SITE E	Diethyl phthalate	2000	mg/L	na	na	na	na	na	na	na	na	na
MW-40A	B	SITE E	2,4-Dimethylphenol	49	mg/L	na	na	na	na	na	na	na	na	na
MW-40A	B	SITE E	1-Methyl naphthalene	3.1	mg/L	na	na	na	na	na	na	na	na	na
MW-40A	B	SITE E	2-Methyl naphthalene	9.8	mg/L	na	na	na	na	na	na	na	na	na
MW-40A	B	SITE E	Napthalene	49	mg/L	na	na	na	na	na	na	na	na	na
MW-40A	B	SITE E	Pentachlorophenol	0.1	mg/L	na	na	na	na	na	na	na	na	na
MW-40A	B	SITE E	Phenol	730	mg/L	na	na	na	na	na	na	na	na	na
MW-40A	B	SITE E	Pyridine	2.4	mg/L	na	na	na	na	na	na	na	na	na
MW-40A	B	SITE E	Arsenic	1.0	mg/L	na	na	na	na	na	na	na	na	na
MW-40A	B	SITE E	Beryllium	0.4	mg/L	na	na	na	na	na	na	na	na	na
MW-40A	B	SITE E	Nickel	49	mg/L	na	na	na	na	na	na	na	na	na
MW-40A	B	SITE E	Selenium	5.0	mg/L	na	na	na	na	na	na	na	na	na
MW-40A	B	SITE E	Vanadium	4.4	mg/L	na	na	na	na	na	na	na	na	na
MW-40A	B	SITE E	D. O.	na	mg/L	2.7	2.2	2.1	1.8	1.9	1.8	1.8	1.4	0.9
MW-40A	B	SITE E	ORP	na	mV	nm	nm	nm	(145.8)	(163.7)	(191.1)	(229.8)	(176.1)	(186.7)
MW-40A	B	SITE E	pH	na	stnd unit	6.78	7.03	7.08	6.98	6.90	7.05	7.09	7.06	7.14
MW-40A	B	SITE E	Specific Conductance	na	µmhos/cm	nm	nm	nm	nm	nm	nm	32,300	33,200	31,900
MW-40A	B	SITE E	Temperature	na	oC	nm	nm	nm	nm	nm	nm	20.2	22.8	20.0
MW-40A	B	SITE E	Turbidity	na	NTU	nm	nm	nm	nm	nm	nm	21.80	8.90	8.70
MW-41	A	SITE E	Benzene	0.5	mg/L	0.36	0.362	0.435	0.429	0.372	0.373	0.264	0.375	0.361
MW-41	A	SITE E	Benzenethiol	0.24	mg/L	0.1100	0.2740	0.2930	0.1010	0.1920	0.1800	0.2210	0.1450	0.1270
MW-41	A	SITE E	Ethylbenzene	70	mg/L	0.437	0.308	0.368	0.32	0.274	0.269	0.205	0.256	0.252
MW-41	A	SITE E	Toluene	100	mg/L	0.0575	0.0463	0.054	0.0459	0.0476	0.0477	0.0351	0.0448	0.0417
MW-41	A	SITE E	Xylenes, total	1000	mg/L	0.307	0.239	0.271	0.203	0.216	0.157	0.126	0.169	0.159
MW-41	A	SITE E	Acetone	2200	mg/L	ns	ns	ns	ns	ns	ns	ns	ns	ns
MW-41	A	SITE E	Carbon disulfide	240	mg/L	ns	ns	ns	ns	ns	ns	ns	ns	ns
MW-41	A	SITE E	Methyl ethyl Ketone	1500	mg/L	ns	ns	ns	ns	ns	ns	ns	ns	ns

Table VI.B.3.b - GROUNDWATER MONITORING SYSTEM RESULTS - BICA and SITE E PROGRAMS

Alon USA LP - Big Spring Refinery

Well No.	Screen	Program	Constituent	$^{GW}GW_{Class3}$ (mg/L)	Units	CURRENT PERMIT ANALYSIS								
						Jul-19	Jan-20	Jul-20	Jan-21	Jul-21	Jan-22	Jul-22	Jan-23	Jul-23
MW-40	A	SITE E	Selenium	5.0	mg/L	na	na	na	ns	0.0014	na	<0.005	<0.014	na
MW-40	A	SITE E	Vanadium	4.4	mg/L	na	na	na	ns	0.0037	na	0.0016	<0.0018	na
MW-40	A	SITE E	D. O.	na	mg/L	1.6	1.6	1.6	1.6	2.2	2.2	2.1	2.3	1.8
MW-40	A	SITE E	ORP	na	mV	(165.9)	(89.2)	(178.2)	(178.2)	151.7	(128.3)	(187.0)	(148.7)	(139.9)
MW-40	A	SITE E	pH	na	stnd unit	6.72	6.82	6.99	6.99	6.89	6.72	6.45	6.41	6.59
MW-40	A	SITE E	Specific Conductance	na	µmhos/cm	10,250	11,080	13,800	13,800	13,200	15,070	15,260	18,500	19,700
MW-40	A	SITE E	Temperature	na	oC	22.5	18.3	23.6	23.6	18.1	22.8	23.7	19.4	24.7
MW-40	A	SITE E	Turbidity	na	NTU	8.70	16.10	8.30	8.30	8.10	5.20	7.70	8.40	7.70
MW-40A	B	SITE E	Benzene	0.5	mg/L	0.314	0.3400	0.3240	0.3240	0.2940	0.3870	0.3050	0.3270	0.3200
MW-40A	B	SITE E	Benzenethiol	0.24	mg/L	0.115	0.0960	0.0990	0.0990	0.0859	0.0711	<0.011	0.0729	0.1860
MW-40A	B	SITE E	Ethylbenzene	70	mg/L	0.169	0.1800	0.1720	0.1720	0.1580	0.1770	0.1850	0.2070	0.1990
MW-40A	B	SITE E	Toluene	100	mg/L	0.258	0.2660	0.2340	0.2340	0.1150	0.2500	0.2150	0.2220	0.2370
MW-40A	B	SITE E	Xylenes, total	1000	mg/L	0.211	0.2310	0.2120	0.2120	0.1190	0.2220	0.2520	0.2480	0.2430
MW-40A	B	SITE E	Acetone	2200	mg/L	na	na	na	ns	<0.10	na	<0.0057	0.0324	na
MW-40A	B	SITE E	Carbon disulfide	240	mg/L	na	na	na	ns	<0.010	na	0.0013	<0.0014	na
MW-40A	B	SITE E	Methyl ethyl Ketone	1500	mg/L	na	na	na	ns	<0.017	na	<0.00078	0.0105	na
MW-40A	B	SITE E	Cresols, totals	120	mg/L	na	na	na	ns	0.0123	na	0.0472	0.0644	na
MW-40A	B	SITE E	Diethyl phthalate	2000	mg/L	na	na	na	ns	<0.001	na	<0.000072	<0.00046	na
MW-40A	B	SITE E	2,4-Dimethylphenol	49	mg/L	na	na	na	ns	1.8400	na	4.1800	3.5200	na
MW-40A	B	SITE E	1-Methyl naphthalene	3.1	mg/L	na	na	na	ns	0.0708	na	0.0434	0.0542	na
MW-40A	B	SITE E	2-Methyl naphthalene	9.8	mg/L	na	na	na	ns	<0.0013	na	0.0012	<0.00032	na
MW-40A	B	SITE E	Napthalene	49	mg/L	na	na	na	ns	0.0083	na	0.0587	0.0694	na
MW-40A	B	SITE E	Pentachlorophenol	0.1	mg/L	na	na	na	ns	0.0124	na	0.0130	0.0211	na
MW-40A	B	SITE E	Phenol	730	mg/L	na	na	na	ns	0.0017	na	<0.000027	0.0270	na
MW-40A	B	SITE E	Pyridine	2.4	mg/L	na	na	na	ns	0.0011	na	<0.001	<0.0037	na
MW-40A	B	SITE E	Arsenic	1.0	mg/L	na	na	na	ns	0.0819	na	0.0926	0.0991	na
MW-40A	B	SITE E	Beryllium	0.4	mg/L	na	na	na	ns	<0.0020	na	<0.001	<0.0038	na
MW-40A	B	SITE E	Nickel	49	mg/L	na	na	na	ns	0.0463	na	0.0127	0.0547	na
MW-40A	B	SITE E	Selenium	5.0	mg/L	na	na	na	ns	0.0011	na	<0.005	<0.014	na
MW-40A	B	SITE E	Vanadium	4.4	mg/L	na	na	na	ns	0.0016	na	0.0031	0.0037	na
MW-40A	B	SITE E	D. O.	na	mg/L	1.4	1.2	1.5	1.5	2.1	2.2	1.7	1.8	1.8
MW-40A	B	SITE E	ORP	na	mV	(192.3)	(114.7)	(182.3)	(182.3)	(141.7)	(147.8)	(193.9)	(181.2)	(159.4)
MW-40A	B	SITE E	pH	na	stnd unit	7.11	7.17	7.10	7.10	7.18	7.08	6.79	6.95	7.08
MW-40A	B	SITE E	Specific Conductance	na	µmhos/cm	21,300	24,500	26,900	26,900	27,900	23,000	20,800	29,200	34,000
MW-40A	B	SITE E	Temperature	na	oC	22.6	18.8	24.5	24.5	17.8	22.6	23.1	19.1	24.1
MW-40A	B	SITE E	Turbidity	na	NTU	6.10	9.10	6.20	6.20	6.10	4.80	7.40	8.70	11.60
MW-41	A	SITE E	Benzene	0.5	mg/L	0.319	0.3440	0.2680	0.2680	0.2540	0.2270	0.1940	0.1830	0.1340
MW-41	A	SITE E	Benzenethiol	0.24	mg/L	0.1990	0.1390	0.1800	0.1800	0.0995	0.2860	0.1320	0.1080	0.1740
MW-41	A	SITE E	Ethylbenzene	70	mg/L	0.261	0.2650	0.2520	0.2520	0.2400	0.1990	0.1480	0.1590	0.1050
MW-41	A	SITE E	Toluene	100	mg/L	0.045	0.0398	0.0344	0.0344	0.0315	0.0295	0.0317	0.0370	0.0308
MW-41	A	SITE E	Xylenes, total	1000	mg/L	0.157	0.1400	0.1280	0.1280	0.1160	0.1270	0.0821	0.0819	0.0558
MW-41	A	SITE E	Acetone	2200	mg/L	ns	ns	ns	ns	<0.050	na	<0.0011	0.0049	na
MW-41	A	SITE E	Carbon disulfide	240	mg/L	ns	ns	ns	ns	<0.005	na	<0.00027	<0.00027	na
MW-41	A	SITE E	Methyl ethyl Ketone	1500	mg/L	ns	ns	ns	ns	<0.0083	na	<0.00078	<0.0014	na

Table VI.B.3.b - GROUNDWATER MONITORING SYSTEM RESULTS - BICA and SITE E PROGRAMS

Alon USA LP - Big Spring Refinery

Well No.	Screen	Program	Constituent	$^{GW}GW_{Class3}$ (mg/L)	Units	PRE-PERMIT ANALYSIS								
						Jul-10	Jan-11	Jul-11	Jan-12	Jul-12	Jan-13	Jul-13	Jan-14	Jul-14
MW-41	A	SITE E	**Cresols, totals**	**120**	mg/L	0.21	0.041	0.0257	0.0066	DRY	0.0061	0.023	0.0161	0.0326
MW-41	A	SITE E	**Diethyl phthalate**	**2000**	mg/L	<0.051	<0.02	<0.0043	<0.0011	DRY	<0.0061	<0.0061	<0.0056	<0.0056
MW-41	A	SITE E	**2,4-Dimethylphenol**	**49**	mg/L	1.3	0.8	0.551	0.652	DRY	0.697	1.76	0.972	1.49
MW-41	A	SITE E	**1-Methyl naphthalene**	**3.1**	mg/L	0.16	0.18	0.0156	0.147	DRY	0.156	0.136	0.154	0.215
MW-41	A	SITE E	**2-Methyl naphthalene**	**9.8**	mg/L	<0.051	<0.02	<0.0052	<0.0013	DRY	<0.0048	<0.0048	<0.005	<0.005
MW-41	A	SITE E	**Napthalene**	**49**	mg/L	0.76	0.026	0.0228	0.0236	DRY	0.0242	0.041	0.0175	0.0182
MW-41	A	SITE E	**Pentachlorophenol**	**0.1**	mg/L	<0.025	<0.1	0.0115	0.0129	DRY	0.0041	0.0172	0.0044	0.0058
MW-41	A	SITE E	**Phenol**	**730**	mg/L	<0.051	<0.02	<0.003	<0.00078	DRY	<0.0059	<0.0059	<0.0059	<0.0059
MW-41	A	SITE E	**Pyridine**	**2.4**	mg/L	<0.051	<0.02	<0.004	<0.001	DRY	<0.017	<0.017	<0.0051	<0.0051
MW-41	A	SITE E	**Arsenic**	**1.0**	mg/L	0.0549	<0.2	0.0395	0.0431	DRY	0.0518	0.07	0.0641	0.0738
MW-41	A	SITE E	**Beryllium**	**0.4**	mg/L	<0.005	<0.04	0.000059	<0.000023	DRY	<0.00064	<0.00064	<0.00064	<0.00064
MW-41	A	SITE E	**Nickel**	**49**	mg/L	0.0267	<0.05	0.019	0.0225	DRY	0.0404	0.04	0.0402	0.048
MW-41	A	SITE E	**Selenium**	**5.0**	mg/L	<0.01	<0.2	0.0011	<0.0010	DRY	<0.0014	0.0022	0.0037	<0.0014
MW-41	A	SITE E	**Vanadium**	**4.4**	mg/L	<0.005	<0.05	0.0022	0.0022	DRY	0.0022	0.0037	0.003	<0.0011
MW-41	A	SITE E	**D. O.**	**na**	mg/L	nm	nm	nm	nm	DRY	nm	nm	nm	nm
MW-41	A	SITE E	**ORP**	**na**	mV	nm	nm	nm	nm	DRY	nm	nm	nm	nm
MW-41	A	SITE E	**pH**	**na**	stnd unit	6.46	7.13	6.75	6.72	DRY	6.71	5.96	7.63	6.55
MW-41	A	SITE E	**Specific Conductance**	**na**	µmhos/cm	2,000	5,280	5,440	5,620	DRY	5,010	6,050	6,750	5,310
MW-41	A	SITE E	**Temperature**	**na**	oC	23.2	18.3	27.0	20.2	DRY	18.4	21.4	21.1	23.8
MW-41	A	SITE E	**Turbidity**	**na**	NTU	15.30	4.97	40.00	19.00	DRY	5.70	29.90	10.50	14.10
MW-41A	B	SITE E	**Benzene**	**0.5**	mg/L	0.23	0.19	0.0252	0.204	0.209	0.179	0.202	0.198	0.166
MW-41A	B	SITE E	**Benzenethiol**	**0.24**	mg/L	<0.051	<0.2	0.217	0.0675	0.0699	0.195	0.236	0.265	0.164
MW-41A	B	SITE E	**Ethylbenzene**	**70**	mg/L	0.11	0.1	0.0022	0.0788	0.27	0.0703	0.0835	0.0655	0.051
MW-41A	B	SITE E	**Toluene**	**100**	mg/L	0.097	0.092	0.0052	0.102	0.0446	0.0873	0.0992	0.0826	0.0666
MW-41A	B	SITE E	**Xylenes, total**	**1000**	mg/L	0.102	0.089	0.0023	0.0829	0.24	0.0795	0.0986	0.0727	0.0582
MW-41A	B	SITE E	**Acetone**	**2200**	mg/L	<0.012	<0.1	0.0417	<0.01	<0.010	0.0453	0.0201	0.0118	0.032
MW-41A	B	SITE E	**Carbon disulfide**	**240**	mg/L	<0.005	<0.005	<0.00036	0.0023	<0.00036	0.0011	0.0015	0.0015	0.00097
MW-41A	B	SITE E	**Methyl ethyl Ketone**	**1500**	mg/L	<0.012	<0.1	<0.0018	<0.0018	0.0032	<0.0027	0.0046	<0.0027	0.0079
MW-41A	B	SITE E	**Cresols, totals**	**120**	mg/L	<0.051	0.066	0.0315	0.0827	0.0085	0.0133	0.0301	0.0215	0.024
MW-41A	B	SITE E	**Diethyl phthalate**	**2000**	mg/L	<0.051	<0.02	<0.022	<0.0023	<0.0043	<0.0061	<0.0061	<0.0056	<0.0056
MW-41A	B	SITE E	**2,4-Dimethylphenol**	**49**	mg/L	2.8	2.2	2.77	4.27	0.811	3.74	3.28	2.46	3.04
MW-41A	B	SITE E	**1-Methyl naphthalene**	**3.1**	mg/L	0.075	0.068	0.0759	0.0416	0.142	0.0627	0.127	0.0397	0.042
MW-41A	B	SITE E	**2-Methyl naphthalene**	**9.8**	mg/L	<0.051	<0.02	<0.026	0.0122	<0.0052	<0.0048	<0.0048	<0.005	<0.005
MW-41A	B	SITE E	**Napthalene**	**49**	mg/L	0.15	0.17	0.123	0.0995	0.0276	0.0597	0.0571	0.0229	0.0315
MW-41A	B	SITE E	**Pentachlorophenol**	**0.1**	mg/L	<0.026	<0.1	0.0583	0.043	0.0054	0.0272	0.0315	0.0266	0.0406
MW-41A	B	SITE E	**Phenol**	**730**	mg/L	<0.0051	<0.02	<0.015	<0.0016	<0.0030	<0.0059	<0.0059	<0.0059	<0.0059
MW-41A	B	SITE E	**Pyridine**	**2.4**	mg/L	<0.051	<0.02	<0.02	<0.0021	<0.0040	<0.017	<0.017	<0.0051	<0.0051
MW-41A	B	SITE E	**Arsenic**	**1.0**	mg/L	0.0975	<0.2	0.0767	0.11	0.0573	0.11	0.117	0.131	0.0615
MW-41A	B	SITE E	**Beryllium**	**0.4**	mg/L	<0.005	<0.04	0.000082	<0.00011	<0.00064	<0.00064	<0.00064	<0.00064	<0.00064
MW-41A	B	SITE E	**Nickel**	**49**	mg/L	0.0402	0.0631	0.0304	0.0332	0.0318	0.0427	0.047	0.0472	0.0467
MW-41A	B	SITE E	**Selenium**	**5.0**	mg/L	<0.01	<0.2	0.00087	<0.00083	<0.0014	<0.0014	0.0017	0.004	0.0022
MW-41A	B	SITE E	**Vanadium**	**4.4**	mg/L	0.0073	<0.05	0.0064	<0.010	0.0016	0.0067	0.0072	0.0077	0.0052
MW-41A	B	SITE E	**D. O.**	**na**	mg/L	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-41A	B	SITE E	**ORP**	**na**	mV	nm	nm	nm	nm	nm	nm	nm	nm	nm

Table VI.B.3.b - GROUNDWATER MONITORING SYSTEM RESULTS - BICA and SITE E PROGRAMS

Alon USA LP - Big Spring Refinery

Well No.	Screen	Program	Constituent	$^{GW}GW_{Class3}$ (mg/L)	Units	CURRENT PERMIT ANALYSIS								
						Mar-15	Jul-15	Jan-16	Jul-16	Jan-17	Jul-17	Jan-18	Jul-18	Jan-19
MW-41	A	SITE E	Cresols, totals	120	mg/L	ns	ns	ns	ns	ns	ns	ns	ns	ns
MW-41	A	SITE E	Diethyl phthalate	2000	mg/L	ns	ns	ns	ns	ns	ns	ns	ns	ns
MW-41	A	SITE E	2,4-Dimethylphenol	49	mg/L	ns	ns	ns	ns	ns	ns	ns	ns	ns
MW-41	A	SITE E	1-Methyl naphthalene	3.1	mg/L	ns	ns	ns	ns	ns	ns	ns	ns	ns
MW-41	A	SITE E	2-Methyl naphthalene	9.8	mg/L	ns	ns	ns	ns	ns	ns	ns	ns	ns
MW-41	A	SITE E	Napthalene	49	mg/L	ns	ns	ns	ns	ns	ns	ns	ns	ns
MW-41	A	SITE E	Pentachlorophenol	0.1	mg/L	ns	ns	ns	ns	ns	ns	ns	ns	ns
MW-41	A	SITE E	Phenol	730	mg/L	ns	ns	ns	ns	ns	ns	ns	ns	ns
MW-41	A	SITE E	Pyridine	2.4	mg/L	ns	ns	ns	ns	ns	ns	ns	ns	ns
MW-41	A	SITE E	Arsenic	1.0	mg/L	ns	ns	ns	ns	ns	ns	ns	ns	ns
MW-41	A	SITE E	Beryllium	0.4	mg/L	ns	ns	ns	ns	ns	ns	ns	ns	ns
MW-41	A	SITE E	Nickel	49	mg/L	ns	ns	ns	ns	ns	ns	ns	ns	ns
MW-41	A	SITE E	Selenium	5.0	mg/L	ns	ns	ns	ns	ns	ns	ns	ns	ns
MW-41	A	SITE E	Vanadium	4.4	mg/L	ns	ns	ns	ns	ns	ns	ns	ns	ns
MW-41	A	SITE E	D. O.	na	mg/L	2.2	2.0	1.4	1.6	1.6	1.7	2.2	1.0	1.0
MW-41	A	SITE E	ORP	na	mV	nm	nm	nm	(115.6)	(145.1)	(192.8)	(179.2)	(130.2)	(129.6)
MW-41	A	SITE E	pH	na	stnd unit	6.65	6.70	6.66	6.70	6.79	6.71	6.92	6.70	6.71
MW-41	A	SITE E	Specific Conductance	na	µmhos/cm	nm	nm	nm	nm	nm	nm	4,610	5,190	4,780
MW-41	A	SITE E	Temperature	na	oC	nm	nm	nm	nm	nm	nm	21.2	27.5	18.6
MW-41	A	SITE E	Turbidity	na	NTU	nm	nm	nm	nm	nm	nm	8.50	7.50	9.40
MW-41A	B	SITE E	Benzene	0.5	mg/L	DRY	0.178	0.211	0.216	0.195	0.285	0.171	0.258	0.226
MW-41A	B	SITE E	Benzenethiol	0.24	mg/L	DRY	0.218	0.282	0.0849	0.0775	0.177	0.182	0.14	0.105
MW-41A	B	SITE E	Ethylbenzene	70	mg/L	DRY	0.0592	0.0715	0.0738	0.0697	0.0916	0.0677	0.0931	0.0848
MW-41A	B	SITE E	Toluene	100	mg/L	DRY	0.0818	0.0875	0.0824	0.0845	0.113	0.0731	0.12	0.101
MW-41A	B	SITE E	Xylenes, total	1000	mg/L	DRY	0.0703	0.0833	0.0765	0.0832	0.0983	0.0811	0.114	0.0986
MW-41A	B	SITE E	Acetone	2200	mg/L	DRY	na	na	na	na	na	na	na	na
MW-41A	B	SITE E	Carbon disulfide	240	mg/L	DRY	na	na	na	na	na	na	na	na
MW-41A	B	SITE E	Methyl ethyl Ketone	1500	mg/L	DRY	na	na	na	na	na	na	na	na
MW-41A	B	SITE E	Cresols, totals	120	mg/L	DRY	na	na	na	na	na	na	na	na
MW-41A	B	SITE E	Diethyl phthalate	2000	mg/L	DRY	na	na	na	na	na	na	na	na
MW-41A	B	SITE E	2,4-Dimethylphenol	49	mg/L	DRY	na	na	na	na	na	na	na	na
MW-41A	B	SITE E	1-Methyl naphthalene	3.1	mg/L	DRY	na	na	na	na	na	na	na	na
MW-41A	B	SITE E	2-Methyl naphthalene	9.8	mg/L	DRY	na	na	na	na	na	na	na	na
MW-41A	B	SITE E	Napthalene	49	mg/L	DRY	na	na	na	na	na	na	na	na
MW-41A	B	SITE E	Pentachlorophenol	0.1	mg/L	DRY	na	na	na	na	na	na	na	na
MW-41A	B	SITE E	Phenol	730	mg/L	DRY	na	na	na	na	na	na	na	na
MW-41A	B	SITE E	Pyridine	2.4	mg/L	DRY	na	na	na	na	na	na	na	na
MW-41A	B	SITE E	Arsenic	1.0	mg/L	DRY	na	na	na	na	na	na	na	na
MW-41A	B	SITE E	Beryllium	0.4	mg/L	DRY	na	na	na	na	na	na	na	na
MW-41A	B	SITE E	Nickel	49	mg/L	DRY	na	na	na	na	na	na	na	na
MW-41A	B	SITE E	Selenium	5.0	mg/L	DRY	na	na	na	na	na	na	na	na
MW-41A	B	SITE E	Vanadium	4.4	mg/L	DRY	na	na	na	na	na	na	na	na
MW-41A	B	SITE E	D. O.	na	mg/L	DRY	1.8	1.9	1.3	1.4	1.8	2.0	1.1	1.3
MW-41A	B	SITE E	ORP	na	mV	DRY	nm	nm	(97.5)	(129.8)	(153.8)	(180.0)	(121.5)	(107.1)

Table VI.B.3.b - GROUNDWATER MONITORING SYSTEM RESULTS - BICA and SITE E PROGRAMS

Alon USA LP - Big Spring Refinery

Well No.	Screen	Program	Constituent	$^{GW}GW_{Class3}$ (mg/L)	Units	CURRENT PERMIT ANALYSIS								
						Jul-19	Jan-20	Jul-20	Jan-21	Jul-21	Jan-22	Jul-22	Jan-23	Jul-23
MW-41	A	SITE E	Cresols, totals	120	mg/L	ns	ns	ns	ns	0.0031	na	0.0080	<0.0020	na
MW-41	A	SITE E	Diethyl phthalate	2000	mg/L	ns	ns	ns	ns	<0.0010	na	<0.000072	<0.00046	na
MW-41	A	SITE E	2,4-Dimethylphenol	49	mg/L	ns	ns	ns	ns	0.2240	na	0.1780	0.1780	na
MW-41	A	SITE E	1-Methyl naphthalene	3.1	mg/L	ns	ns	ns	ns	0.0902	na	0.1080	0.0940	na
MW-41	A	SITE E	2-Methyl naphthalene	9.8	mg/L	ns	ns	ns	ns	<0.0013	na	<0.00006	<0.00032	na
MW-41	A	SITE E	Napthalene	49	mg/L	ns	ns	ns	ns	0.0044	na	0.0066	0.0055	na
MW-41	A	SITE E	Pentachlorophenol	0.1	mg/L	ns	ns	ns	ns	0.0024	na	0.0017	<0.0047	na
MW-41	A	SITE E	Phenol	730	mg/L	ns	ns	ns	ns	<0.0011	na	<0.000027	<0.00040	na
MW-41	A	SITE E	Pyridine	2.4	mg/L	ns	ns	ns	ns	0.0017	na	<0.001	<0.0037	na
MW-41	A	SITE E	Arsenic	1.0	mg/L	ns	ns	ns	ns	0.0554	na	0.0604	0.0554	na
MW-41	A	SITE E	Beryllium	0.4	mg/L	ns	ns	ns	ns	<0.0005	na	<0.001	<0.0038	na
MW-41	A	SITE E	Nickel	49	mg/L	ns	ns	ns	ns	0.0400	na	0.0414	0.0524	na
MW-41	A	SITE E	Selenium	5.0	mg/L	ns	ns	ns	ns	0.0014	na	<0.005	<0.014	na
MW-41	A	SITE E	Vanadium	4.4	mg/L	ns	ns	ns	ns	0.0024	na	0.0028	0.0022	na
MW-41	A	SITE E	D. O.	na	mg/L	1.5	2.1	1.7	1.7	2.3	2.2	1.7	1.9	1.8
MW-41	A	SITE E	ORP	na	mV	(171.5)	(57.6)	(150.2)	(150.2)	(68.1)	(85.2)	(144.0)	(162.3)	(132.1)
MW-41	A	SITE E	pH	na	stnd unit	6.70	6.65	6.83	6.83	6.90	6.90	6.33	6.52	6.64
MW-41	A	SITE E	Specific Conductance	na	µmhos/cm	3,490	4,630	4,580	4,580	5,310	5,340	5,510	5,860	7,750
MW-41	A	SITE E	Temperature	na	oC	22.2	20.5	24.4	24.4	19.4	24.4	24.5	19.2	24.8
MW-41	A	SITE E	Turbidity	na	NTU	11.50	8.60	7.90	7.90	4.20	4.90	8.50	8.40	7.30
MW-41A	B	SITE E	Benzene	0.5	mg/L	0.112	0.1410	0.1240	0.1240	0.1480	0.1520	0.1530	0.1690	0.1370
MW-41A	B	SITE E	Benzenethiol	0.24	mg/L	0.0461	0.0703	0.0657	0.0657	0.0634	0.0744	0.0247	0.0193	0.0699
MW-41A	B	SITE E	Ethylbenzene	70	mg/L	0.0567	0.0735	0.0792	0.0792	0.0902	0.0813	0.0815	0.1030	0.0735
MW-41A	B	SITE E	Toluene	100	mg/L	0.0392	0.0565	0.0418	0.0418	0.0488	0.0451	0.0404	0.0484	0.0404
MW-41A	B	SITE E	Xylenes, total	1000	mg/L	0.0375	0.0570	0.0462	0.0462	0.0530	0.0485	0.0462	0.0566	0.0432
MW-41A	B	SITE E	Acetone	2200	mg/L	na	na	na	ns	<0.10	na	<0.0011	0.0098	na
MW-41A	B	SITE E	Carbon disulfide	240	mg/L	na	na	na	ns	<0.010	na	0.0011	0.0011	na
MW-41A	B	SITE E	Methyl ethyl Ketone	1500	mg/L	na	na	na	ns	<0.017	na	0.0153	0.0111	na
MW-41A	B	SITE E	Cresols, totals	120	mg/L	na	na	na	ns	0.0755	na	0.0782	0.0670	na
MW-41A	B	SITE E	Diethyl phthalate	2000	mg/L	na	na	na	ns	<0.0010	na	<0.000071	<0.00046	na
MW-41A	B	SITE E	2,4-Dimethylphenol	49	mg/L	na	na	na	ns	0.2690	na	0.2130	0.1920	na
MW-41A	B	SITE E	1-Methyl naphthalene	3.1	mg/L	na	na	na	ns	0.0495	na	0.0413	0.0465	na
MW-41A	B	SITE E	2-Methyl naphthalene	9.8	mg/L	na	na	na	ns	0.0218	na	0.0233	0.0272	na
MW-41A	B	SITE E	Napthalene	49	mg/L	na	na	na	ns	0.0758	na	0.0666	0.0794	na
MW-41A	B	SITE E	Pentachlorophenol	0.1	mg/L	na	na	na	ns	0.0037	na	0.0020	<0.0047	na
MW-41A	B	SITE E	Phenol	730	mg/L	na	na	na	ns	<0.0011	na	<0.000027	<0.00040	na
MW-41A	B	SITE E	Pyridine	2.4	mg/L	na	na	na	ns	<0.0011	na	<0.001	<0.0037	na
MW-41A	B	SITE E	Arsenic	1.0	mg/L	na	na	na	ns	0.0344	na	0.0355	0.0306	na
MW-41A	B	SITE E	Beryllium	0.4	mg/L	na	na	na	ns	<0.0020	na	<0.005	<0.015	na
MW-41A	B	SITE E	Nickel	49	mg/L	na	na	na	ns	0.0227	na	0.0281	0.0321	na
MW-41A	B	SITE E	Selenium	5.0	mg/L	na	na	na	ns	0.0016	na	<0.025	<0.056	na
MW-41A	B	SITE E	Vanadium	4.4	mg/L	na	na	na	ns	0.0025	na	<0.005	<0.0072	na
MW-41A	B	SITE E	D. O.	na	mg/L	1.7	1.5	1.8	1.8	2.7	2.4	2.6	2.3	1.8
MW-41A	B	SITE E	ORP	na	mV	(82.5)	(59.1)	(128.5)	(128.5)	(76.2)	(79.5)	(69.6)	(110.2)	(119.4)

Table VI.B.3.b - GROUNDWATER MONITORING SYSTEM RESULTS - BICA and SITE E PROGRAMS

Alon USA LP - Big Spring Refinery

Well No.	Screen	Program	Constituent	$^{GW}GW_{Class3}$ (mg/L)	Units	PRE-PERMIT ANALYSIS								
						Jul-10	Jan-11	Jul-11	Jan-12	Jul-12	Jan-13	Jul-13	Jan-14	Jul-14
MW-41A	B	SITE E	pH	na	stnd unit	6.63	7.10	6.62	6.61	6.34	6.85	6.05	7.71	6.83
MW-41A	B	SITE E	Specific Conductance	na	µmhos/cm	56,700	55,200	53,800	43,300	5,310	40,100	40,000	39,400	37,600
MW-41A	B	SITE E	Temperature	na	oC	24.0	18.2	25.4	19.5	23.8	19.0	23.0	20.8	26.7
MW-41A	B	SITE E	Turbidity	na	NTU	9.4	2.82	23.9	165	5	0	18.6	0	1.5
MW-52	A	BICA	Benzene	0.5	mg/L	<0.001	<0.001	<0.00025	<0.00025	<0.001	<0.00034	<0.001	0.00041	<0.001
MW-52	A	BICA	TDS	na	mg/L	990	786	nc	708	860	825	816	636	NC
MW-52	A	BICA	D. O.	na	mg/L	nm	nm	nm	nm	5.8	5.8	5.7	2.7	3.2
MW-52	A	BICA	ORP	na	mV	nm	nm	nm	nm	nm	nm	nm	nm	47.3
MW-52	A	BICA	pH	na	stnd unit	7.11	6.91	6.85	7.24	7.82	7.13	7.14	7.01	6.91
MW-52	A	BICA	Specific Conductance	na	µmhos/cm	969	1,220	1,220	1	1,220	1,200	1,160	987	1,060
MW-52	A	BICA	Temperature	na	°C	26.75	16.81	22.81	18.70	21.50	20.04	21.16	19.05	28.98
MW-52	A	BICA	Turbidity	na	NTU	0.00	0.50	24.40	0.10	3.10	43.90	5.50	0.00	29.90
MW-52A	B	BICA	Benzene	0.5	mg/L	<0.001	<0.001	<0.00025	<0.00025	<0.001	<0.00034	<0.001	0.00041	<0.001
MW-52A	B	BICA	TDS	na	mg/L	559	490	nc	530	510	514	525	509	NC
MW-52A	B	BICA	D. O.	na	mg/L	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-52A	B	BICA	ORP	na	mV	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-52A	B	BICA	pH	na	stnd unit	7.34	7.38	7.84	7.24	8.01	7.36	7.31	6.95	6.89
MW-52A	B	BICA	Specific Conductance	na	µmhos/cm	674	748	861	1	844	772	804	811	789
MW-52A	B	BICA	Temperature	na	°C	30.37	17.79	21.79	18.70	21.78	20.25	25.10	19.50	29.59
MW-52A	B	BICA	Turbidity	na	NTU	0.00	0.00	4.20	0.00	0.00	0.00	15.60	103.00	0.00
IW-58	A	BICA	Benzene	0.5	mg/L	ns	ns	ns	ns	ns	ns	0.68	0.83	0.73
IW-58	A	BICA	TDS	na	mg/L	ns	ns	ns	ns	ns	ns	ns	24,400	25,400
IW-58	A	BICA	D. O.	na	mg/L	nm	nm	nm	nm	nm	nm	nm	nm	nm
IW-58	A	BICA	ORP	na	mV	nm	nm	nm	nm	nm	nm	nm	nm	nm
IW-58	A	BICA	pH	na	stnd unit	nm	nm	nm	nm	nm	nm	nm	nm	nm
IW-58	A	BICA	Specific Conductance	na	µmhos/cm	nm	nm	nm	nm	nm	nm	nm	nm	nm
IW-58	A	BICA	Temperature	na	°C	nm	nm	nm	nm	nm	nm	nm	nm	nm
IW-58	A	BICA	Turbidity	na	NTU	nm	nm	nm	nm	nm	nm	nm	nm	nm
IW-58A	B	BICA	Benzene	0.5	mg/L	ns	ns	ns	ns	ns	ns	ns	ns	ns
IW-58A	B	BICA	TDS	na	mg/L	ns	ns	ns	ns	ns	ns	ns	ns	ns
IW-58A	B	BICA	D. O.	na	mg/L	nm	nm	nm	nm	nm	nm	nm	nm	nm
IW-58A	B	BICA	ORP	na	mV	nm	nm	nm	nm	nm	nm	nm	nm	nm
IW-58A	B	BICA	pH	na	stnd unit	nm	nm	nm	nm	nm	nm	nm	nm	nm
IW-58A	B	BICA	Specific Conductance	na	µmhos/cm	nm	nm	nm	nm	nm	nm	nm	nm	nm
IW-58A	B	BICA	Temperature	na	°C	nm	nm	nm	nm	nm	nm	nm	nm	nm
IW-58A	B	BICA	Turbidity	na	NTU	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-76	A	BICA	Benzene	0.5	mg/L	<0.001	<0.001	<0.001	<0.00025	DRY	0.004	<0.001	0.00041	<0.001
MW-76	A	BICA	TDS	na	mg/L	670	585	nc	494	DRY	600	585	786	nc
MW-76	A	BICA	D. O.	na	mg/L	nm	nm	nm	nm	DRY	nm	nm	nm	nm
MW-76	A	BICA	ORP	na	mV	nm	nm	nm	nm	DRY	nm	nm	nm	nm
MW-76	A	BICA	pH	na	stnd unit	7.20	6.80	6.65	8.35	DRY	6.90	7.19	7.20	7.43
MW-76	A	BICA	Specific Conductance	na	µmhos/cm	837	400	873	1	DRY	860	995	821	787
MW-76	A	BICA	Temperature	na	°C	22.10	17.27	23.70	20.57	DRY	19.31	21.85	20.20	26.39

Table VI.B.3.b - GROUNDWATER MONITORING SYSTEM RESULTS - BICA and SITE E PROGRAMS

Alon USA LP - Big Spring Refinery

Well No.	Screen	Program	Constituent	$^{GW}GW_{Class3}$ (mg/L)	Units	CURRENT PERMIT ANALYSIS								
						Mar-15	Jul-15	Jan-16	Jul-16	Jan-17	Jul-17	Jan-18	Jul-18	Jan-19
MW-41A	B	SITE E	pH	na	stnd unit	DRY	6.62	6.60	6.64	6.69	6.63	6.80	6.63	6.56
MW-41A	B	SITE E	Specific Conductance	na	µmhos/cm	DRY	nm	nm	nm	nm	nm	45,200	49,200	57,800
MW-41A	B	SITE E	Temperature	na	oC	DRY	nm	nm	nm	nm	nm	20.3	25.2	19.3
MW-41A	B	SITE E	Turbidity	na	NTU	DRY	nm	nm	nm	nm	nm	9	6.1	5.2
MW-52	A	BICA	Benzene	0.5	mg/L	0.00041	<0.001	<0.00047	<0.00047	<0.00047	<0.0003	<0.0003	<0.0004	<0.0004
MW-52	A	BICA	TDS	na	mg/L	636	NC	964	1,120	1,300	1,060	968	1,370	1,090
MW-52	A	BICA	D. O.	na	mg/L	2.7	2.5	2.7	2.5	2.4	2.6	3.4	4.2	4.3
MW-52	A	BICA	ORP	na	mV	145.0	(11.0)	nm	153.5	124.7	76.0	107.4	138.2	116.4
MW-52	A	BICA	pH	na	stnd unit	7.01	6.91	7.24	6.83	6.79	6.71	6.65	6.82	7.24
MW-52	A	BICA	Specific Conductance	na	µmhos/cm	nm	nm	nm	nm	nm	nm	1,331	1,388	1,344
MW-52	A	BICA	Temperature	na	°C	nm	nm	nm	nm	nm	nm	18.90	22.40	18.50
MW-52	A	BICA	Turbidity	na	NTU	nm	nm	nm	nm	nm	nm	7.20	8.00	7.50
MW-52A	B	BICA	Benzene	0.5	mg/L	<0.00034	<0.00034	<0.00047	<0.00047	<0.00047	<0.0003	<0.0003	<0.0004	<0.0004
MW-52A	B	BICA	TDS	na	mg/L	570	677	537	736	705	799	650	838	702
MW-52A	B	BICA	D. O.	na	mg/L	1.8	3.0	3.1	2.6	2.7	2.8	3.5	3.7	4.2
MW-52A	B	BICA	ORP	na	mV	nm	nm	nm	(183.2)	(148.7)	(54.5)	98.6	150.3	132.6
MW-52A	B	BICA	pH	na	stnd unit	7.15	7.57	6.96	6.94	6.91	6.83	6.85	7.03	7.22
MW-52A	B	BICA	Specific Conductance	na	µmhos/cm	nm	nm	nm	nm	nm	nm	994	1,062	976
MW-52A	B	BICA	Temperature	na	°C	nm	nm	nm	nm	nm	nm	19.10	23.10	17.30
MW-52A	B	BICA	Turbidity	na	NTU	nm	nm	nm	nm	nm	nm	3.90	7.60	6.50
IW-58	A	BICA	Benzene	0.5	mg/L	0.001	0.853	<0.00047	<0.00047	0.0141	<0.0003	<0.0003	0.0287	1.29
IW-58	A	BICA	TDS	na	mg/L	25,390	5,340	4,910	5,220	4,910	6,550	5,850	7,880	8,600
IW-58	A	BICA	D. O.	na	mg/L	nm	0.8	0.7	0.9	1.2	1.0	1.7	1.3	1.6
IW-58	A	BICA	ORP	na	mV	nm	nm	nm	5.0	31.5	130.3	6.2	(62.3)	(39.0)
IW-58	A	BICA	pH	na	stnd unit	nm	6.32	6.28	7.01	7.22	6.98	6.90	6.63	6.57
IW-58	A	BICA	Specific Conductance	na	µmhos/cm	nm	nm	nm	nm	nm	nm	9,331	14,300	15,870
IW-58	A	BICA	Temperature	na	°C	nm	nm	nm	nm	nm	nm	19.80	22.70	18.70
IW-58	A	BICA	Turbidity	na	NTU	nm	nm	nm	nm	nm	nm	2.10	1.50	1.90
IW-58A	B	BICA	Benzene	0.5	mg/L	0.003	<0.00034	0.0019	0.0011	<0.00047	<0.0003	<0.0003	<0.0004	4.23
IW-58A	B	BICA	TDS	na	mg/L	ns	4,260	5,330	4,960	5,160	5,060	4,850	5,650	10,500
IW-58A	B	BICA	D. O.	na	mg/L	nm	1.5	2.1	1.4	1.4	1.3	1.3	1.2	1.2
IW-58A	B	BICA	ORP	na	mV	nm	nm	nm	127.4	13.1	130.1	45.7	76.4	(35.9)
IW-58A	B	BICA	pH	na	stnd unit	nm	6.60	6.20	6.39	6.93	6.27	6.44	6.44	6.78
IW-58A	B	BICA	Specific Conductance	na	µmhos/cm	nm	nm	nm	nm	nm	nm	7,356	11,550	16,800
IW-58A	B	BICA	Temperature	na	°C	nm	nm	nm	nm	nm	nm	19.60	23.10	19.10
IW-58A	B	BICA	Turbidity	na	NTU	nm	nm	nm	nm	nm	nm	1.6	1	0.7
MW-76	A	BICA	Benzene	0.5	mg/L	<0.00034	<0.00034	<0.00047	<0.00047	<0.00047	<0.0003	<0.0003	<0.0004	<0.0004
MW-76	A	BICA	TDS	na	mg/L	638	701	737	1,010	1,030	1,080	791	1,230	969
MW-76	A	BICA	D. O.	na	mg/L	2.8	6.5	3.3	3.0	3.3	2.8	4.6	5.8	5.4
MW-76	A	BICA	ORP	na	mV	nm	nm	nm	(1.4)	12.0	72.1	108.1	114.2	105.1
MW-76	A	BICA	pH	na	stnd unit	7.15	7.68	7.33	7.08	7.02	7.27	6.95	7.05	7.16
MW-76	A	BICA	Specific Conductance	na	µmhos/cm	nm	nm	nm	nm	nm	nm	1,137	1,201	1,168
MW-76	A	BICA	Temperature	na	°C	nm	nm	nm	nm	nm	nm	20.20	24.20	18.20

Table VI.B.3.b - GROUNDWATER MONITORING SYSTEM RESULTS - BICA and SITE E PROGRAMS

Alon USA LP - Big Spring Refinery

Well No.	Screen	Program	Constituent	$^{GW}GW_{Class3}$ (mg/L)	Units	CURRENT PERMIT ANALYSIS								
						Jul-19	Jan-20	Jul-20	Jan-21	Jul-21	Jan-22	Jul-22	Jan-23	Jul-23
MW-41A	B	SITE E	pH	na	stnd unit	6.36	6.24	6.45	6.45	6.15	6.38	5.42	6.24	6.36
MW-41A	B	SITE E	Specific Conductance	na	µmhos/cm	47,090	107,300	98,100	98,100	60,900	63,700	54,600	96,400	12,470
MW-41A	B	SITE E	Temperature	na	oC	23.4	20.4	24.6	24.6	20.2	23.6	26.9	17.7	24.4
MW-41A	B	SITE E	Turbidity	na	NTU	7.90	9.00	6.20	6.20	6.50	8.70	4.40	8.10	10.90
MW-52	A	BICA	Benzene	0.5	mg/L	<0.0004	<0.0003	<0.003	<0.0003	<0.0003	<0.0003	<0.00023	<0.00023	<0.00023
MW-52	A	BICA	TDS	na	mg/L	1,200	1,320	1,010	1,010	1,030	1,070	805	970	772
MW-52	A	BICA	D. O.	na	mg/L	3.1	3.8	3.6	3.6	5.8	5.8	6.2	5.9	5.8
MW-52	A	BICA	ORP	na	mV	69.6	190.1	92.7	92.7	201.1	46.6	117.5	161.3	105.6
MW-52	A	BICA	pH	na	stnd unit	7.16	6.72	7.05	7.05	6.63	6.90	6.43	6.89	7.17
MW-52	A	BICA	Specific Conductance	na	µmhos/cm	1,220	1,214	1,310	1,310	1,420	1,215	12	1,120	1,107
MW-52	A	BICA	Temperature	na	°C	23.8	18.4	21.8	21.8	19.0	29.4	22.6	14.8	23.0
MW-52	A	BICA	Turbidity	na	NTU	26.20	8.60	4.10	4.10	5.90	5.10	6.10	6.10	7.40
MW-52A	B	BICA	Benzene	0.5	mg/L	<0.0004	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.00023	<0.00023	<0.00023
MW-52A	B	BICA	TDS	na	mg/L	766	812	854	854	742	844	904	884	1,010
MW-52A	B	BICA	D. O.	na	mg/L	3.4	3.9	3.4	3.4	5.5	3.1	3.6	4.4	4.7
MW-52A	B	BICA	ORP	na	mV	86.4	194.1	104.9	104.9	191.2	55.1	68.1	54.1	100.6
MW-52A	B	BICA	pH	na	stnd unit	6.90	6.65	7.18	7.18	6.83	6.66	6.80	6.80	6.65
MW-52A	B	BICA	Specific Conductance	na	µmhos/cm	948	982	1,017	1,017	1,174	1,110	1,163	1,173	1,005
MW-52A	B	BICA	Temperature	na	°C	23.5	17.6	22.7	22.7	18.7	29.7	22.7	15.4	25.9
MW-52A	B	BICA	Turbidity	na	NTU	7.00	7.00	6.20	6.20	5.80	6.10	7.20	5.70	8.00
IW-58	A	BICA	Benzene	0.5	mg/L	0.132	0.058	0.00084	0.00084	0.001	0.037	0.0648	0.0134	<0.00023
IW-58	A	BICA	TDS	na	mg/L	4,210	4,090	3,620	3,620	3,460	4,320	3,240	2,200	3,440
IW-58	A	BICA	D. O.	na	mg/L	1.2	1.0	4.9	4.9	2.0	2.4	2.6	2.8	2.8
IW-58	A	BICA	ORP	na	mV	(97.3)	(112.7)	70.8	70.8	(79.5)	(39.7)	35.8	118.4	82.3
IW-58	A	BICA	pH	na	stnd unit	6.59	6.87	7.29	7.29	6.80	6.85	7.32	7.28	7.32
IW-58	A	BICA	Specific Conductance	na	µmhos/cm	9,369	5,883	736	736	5,900	6,830	5,140	4,930	3,610
IW-58	A	BICA	Temperature	na	°C	22.4	19.8	22.8	22.8	18.9	21.3	20.8	18.0	22.3
IW-58	A	BICA	Turbidity	na	NTU	2.10	1.80	3.30	3.30	1.90	2.00	1.80	1.40	1.70
IW-58A	B	BICA	Benzene	0.5	mg/L	0.258	0.0021	<0.0003	<0.0003	<0.0003	<0.0003	<0.00023	<0.00023	<0.00023
IW-58A	B	BICA	TDS	na	mg/L	6,480	5,720	4,030	4,030	2,380	5,710	3,660	2,620	4,180
IW-58A	B	BICA	D. O.	na	mg/L	0.8	1.4	3.7	3.7	2.3	2.1	2.6	3.0	2.4
IW-58A	B	BICA	ORP	na	mV	(94.6)	(87.5)	92.7	92.7	13.6	82.6	77.5	65.3	53.7
IW-58A	B	BICA	pH	na	stnd unit	6.83	6.91	7.40	7.40	7.02	6.80	6.93	7.00	7.16
IW-58A	B	BICA	Specific Conductance	na	µmhos/cm	9,190	8,429	691	691	5,490	8,820	5,470	4,450	3,010
IW-58A	B	BICA	Temperature	na	°C	22.3	19.7	22.1	22.1	18.8	22.1	20.1	17.8	21.3
IW-58A	B	BICA	Turbidity	na	NTU	1.00	1.20	3.10	3.10	0.80	1.30	1.80	2.00	2.10
MW-76	A	BICA	Benzene	0.5	mg/L	<0.0004	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.00023	<0.00023	<0.00023
MW-76	A	BICA	TDS	na	mg/L	1,260	1,250	1,060	1,060	1,030	1,150	1,200	1,270	1,610
MW-76	A	BICA	D. O.	na	mg/L	4.0	6.3	4.6	4.6	6.6	4.5	5.4	6.5	5.6
MW-76	A	BICA	ORP	na	mV	103.8	187.0	107.1	107.1	212.7	60.1	72.4	103.2	99.0
MW-76	A	BICA	pH	na	stnd unit	7.16	6.88	7.03	7.03	6.94	7.07	6.89	6.92	7.10
MW-76	A	BICA	Specific Conductance	na	µmhos/cm	1,141	1,081	1,249	1,249	1,380	1,280	1,383	1,420	1,369
MW-76	A	BICA	Temperature	na	°C	25.6	20.0	24.5	24.5	19.6	25.2	22.7	16.3	22.1

Table VI.B.3.b - GROUNDWATER MONITORING SYSTEM RESULTS - BICA and SITE E PROGRAMS

Alon USA LP - Big Spring Refinery

Well No.	Screen	Program	Constituent	$^{GW}GW_{Class3}$ (mg/L)	Units	PRE-PERMIT ANALYSIS								
						Jul-10	Jan-11	Jul-11	Jan-12	Jul-12	Jan-13	Jul-13	Jan-14	Jul-14
MW-76	A	BICA	Turbidity	na	NTU	0.00	0.00	17.90	0.00	DRY	0.00	3.00	0.00	0.00
MW-76A	B	BICA	Benzene	0.5	mg/L	<0.001	<0.001	<0.00025	<0.00025	<0.001	<0.00034	<0.001	0.00043	<0.001
MW-76A	B	BICA	TDS	na	mg/L	531	481	nc	425	410	522	535	528	nc
MW-76A	B	BICA	D. O.	na	mg/L	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-76A	B	BICA	ORP	na	mV	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-76A	B	BICA	pH	na	stnd unit	7.51	7.47	7.34	7.39	7.76	7.50	8.04	7.17	7.18
MW-76A	B	BICA	Specific Conductance	na	µmhos/cm	694	756	750	1	780	787	845	778	852
MW-76A	B	BICA	Temperature	na	ºC	23.41	18.93	23.59	20.70	21.76	19.79	21.72	20.00	27.67
MW-76A	B	BICA	Turbidity	na	NTU	0.00	4.80	3.30	0.00	4.90	0.00	1.40	0.00	0.00
MW-78	A	BICA	Benzene	0.5	mg/L	<0.001	<0.001	0.00039	<0.0010	0.00028	<0.00034	0.00048	0.00039	<0.00034
MW-78	A	BICA	TDS	na	mg/L	7,320	6,970	5,750	4,960	4,620	4,720	4,420	4,100	3,840
MW-78	A	BICA	D. O.	na	mg/L	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-78	A	BICA	ORP	na	mV	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-78	A	BICA	pH	na	stnd unit	6.71	6.71	6.61	7.15	6.36	6.77	7.17	8.00	6.94
MW-78	A	BICA	Specific Conductance	na	µmhos/cm	10,600	10,000	9,180	8	7,200	6,950	7,000	5,900	5,150
MW-78	A	BICA	Temperature	na	ºC	23.27	18.99	23.20	21.80	23.12	22.01	21.73	0.00	23.74
MW-78	A	BICA	Turbidity	na	NTU	1.00	3.80	0.00	0.00	1.10	0.00	0.00	0.00	0.00
MW-78A	B	BICA	Benzene	0.5	mg/L	<0.001	<0.001	<0.00025	<0.00025	ND	<0.00034	<0.00034	<0.00034	<0.00034
MW-78A	B	BICA	TDS	na	mg/L	5,540	5,410	4,760	4,700	4,900	5,730	5,420	5,170	4,720
MW-78A	B	BICA	D. O.	na	mg/L	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-78A	B	BICA	ORP	na	mV	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-78A	B	BICA	pH	na	stnd unit	7.19	7.45	6.88	7.54	7.46	7.24	7.27	8.79	7.22
MW-78A	B	BICA	Specific Conductance	na	µmhos/cm	9,160	10,400	799	8	8,120	8,470	8,300	7,710	6,290
MW-78A	B	BICA	Temperature	na	ºC	23.24	20.89	24.63	22.01	24.04	21.96	22.03	20.11	23.17
MW-78A	B	BICA	Turbidity	na	NTU	2.20	9.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MW-79	A	BICA	Benzene	0.5	mg/L	<0.001	<0.001	<0.001	0.0292	<0.00025	<0.00034	<0.00034	<0.00034	<0.0034
MW-79	A	BICA	TDS	na	mg/L	2,760	2,870	2,810	3,200	3,630	3,690	3,540	3,150	3,150
MW-79	A	BICA	D. O.	na	mg/L	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-79	A	BICA	ORP	na	mV	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-79	A	BICA	pH	na	stnd unit	6.25	7.09	6.74	7.51	7.00	7.60	6.71	6.61	6.73
MW-79	A	BICA	Specific Conductance	na	µmhos/cm	3,690	4,270	4,580	6	5,960	6,150	5,200	4,840	3,780
MW-79	A	BICA	Temperature	na	ºC	24.08	21.95	24.89	21.58	21.93	21.42	21.87	19.42	23.27
MW-79	A	BICA	Turbidity	na	NTU	248.00	289.00	165.00	167.00	60.30	3.40	1.10	56.80	278.00
MW-79A	B	BICA	Benzene	0.5	mg/L	<0.001	<0.001	<0.00025	<0.00025	0.00031	0.0016	<0.00034	<0.00034	<0.00034
MW-79A	B	BICA	TDS	na	mg/L	6,480	4,960	7,200	8,240	7,500	19,800	6,760	6,460	7,340
MW-79A	B	BICA	D. O.	na	mg/L	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-79A	B	BICA	ORP	na	mV	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-79A	B	BICA	pH	na	stnd unit	6.10	6.99	6.68	6.72	7.57	7.06	7.57	6.57	6.89
MW-79A	B	BICA	Specific Conductance	na	µmhos/cm	10,900	14,300	11,700	13	9,240	1,090	1,060	10,600	9,730
MW-79A	B	BICA	Temperature	na	ºC	22.15	20.54	30.59	19.61	21.11	20.19	19.58	19.23	21.07
MW-79A	B	BICA	Turbidity	na	NTU	158.00	0.00	0.00	0.10	0.00	0.00	0.00	9.00	0.00
MW-80	A	BICA	Benzene	0.5	mg/L	<0.001	<0.001	<0.00025	<0.00025	<0.00025	<0.00034	<0.0034	<0.00034	<0.00034
MW-80	A	BICA	TDS	na	mg/L	18,100	16,800	15,900	12,900	11,700	12,400	13,100	14,100	13,100

Table VI.B.3.b - GROUNDWATER MONITORING SYSTEM RESULTS - BICA and SITE E PROGRAMS

Alon USA LP - Big Spring Refinery

Well No.	Screen	Program	Constituent	$^{GW}GW_{Class3}$ (mg/L)	Units	CURRENT PERMIT ANALYSIS								
						Mar-15	Jul-15	Jan-16	Jul-16	Jan-17	Jul-17	Jan-18	Jul-18	Jan-19
MW-76	A	BICA	Turbidity	na	NTU	nm	nm	nm	nm	nm	nm	6.10	6.80	5.40
MW-76A	B	BICA	Benzene	0.5	mg/L	<0.00034	<0.00034	<0.00047	<0.00047	<0.00047	<0.0003	<0.0003	<0.0004	<0.0004
MW-76A	B	BICA	TDS	na	mg/L	610	493	488	563	569	594	508	709	574
MW-76A	B	BICA	D. O.	na	mg/L	2.9	3.8	2.3	2.0	2.1	2.3	4.4	4.8	4.9
MW-76A	B	BICA	ORP	na	mV	nm	nm	nm	21.4	27.1	105.3	128.8	156.4	144.7
MW-76A	B	BICA	pH	na	stnd unit	7.40	8.00	7.31	7.17	7.08	7.16	6.92	6.94	7.06
MW-76A	B	BICA	Specific Conductance	na	µmhos/cm	nm	nm	nm	nm	nm	nm	830	839	873
MW-76A	B	BICA	Temperature	na	°C	nm	nm	nm	nm	nm	nm	20.40	23.40	17.30
MW-76A	B	BICA	Turbidity	na	NTU	nm	nm	nm	nm	nm	nm	5.00	4.90	5.00
MW-78	A	BICA	Benzene	0.5	mg/L	<0.00034	<0.00034	<0.00047	<0.00047	<0.00047	0.00044	<0.0003	0.00064	<0.0004
MW-78	A	BICA	TDS	na	mg/L	3,800	3,580	3,330	3,550	3,670	4,000	3,560	3,840	3,870
MW-78	A	BICA	D. O.	na	mg/L	0.9	1.4	0.9	0.7	0.6	1.2	0.9	0.9	1.8
MW-78	A	BICA	ORP	na	mV	nm	nm	nm	(37.8)	(104.7)	(102.5)	(151.6)	(155.7)	(96.8)
MW-78	A	BICA	pH	na	stnd unit	6.57	6.84	7.06	7.04	6.79	6.67	7.11	7.31	7.40
MW-78	A	BICA	Specific Conductance	na	µmhos/cm	nm	nm	nm	nm	nm	nm	5,870	4,870	5,600
MW-78	A	BICA	Temperature	na	°C	nm	nm	nm	nm	nm	nm	21.30	23.80	20.70
MW-78	A	BICA	Turbidity	na	NTU	nm	nm	nm	nm	nm	nm	2.90	3.10	3.20
MW-78A	B	BICA	Benzene	0.5	mg/L	<0.00034	<0.00034	<0.00047	<0.00047	<0.00047	<0.0003	<0.0003	<0.0004	<0.0004
MW-78A	B	BICA	TDS	na	mg/L	4,920	5,180	5,150	5,830	6,290	5,420	5,280	5,680	4,980
MW-78A	B	BICA	D. O.	na	mg/L	2.3	1.1	0.7	0.5	0.5	0.5	0.5	0.6	1.8
MW-78A	B	BICA	ORP	na	mV	nm	nm	nm	(99.1)	(96.9)	(84.1)	(127.9)	(131.8)	(68.2)
MW-78A	B	BICA	pH	na	stnd unit	7.20	7.12	7.17	7.11	7.05	7.00	7.44	7.43	7.55
MW-78A	B	BICA	Specific Conductance	na	µmhos/cm	nm	nm	nm	nm	nm	nm	8,520	7,630	7,810
MW-78A	B	BICA	Temperature	na	°C	nm	nm	nm	nm	nm	nm	21.50	23.20	20.30
MW-78A	B	BICA	Turbidity	na	NTU	nm	nm	nm	nm	nm	nm	5.00	3.00	4.90
MW-79	A	BICA	Benzene	0.5	mg/L	<0.00034	<0.00034	<0.00047	<0.00047	<0.00047	<0.0003	<0.0003	<0.0004	<0.0004
MW-79	A	BICA	TDS	na	mg/L	3,160	3,750	3,620	4,560	4,510	4,310	4,220	4,340	4,470
MW-79	A	BICA	D. O.	na	mg/L	1.7	1.5	1.0	1.3	0.9	0.8	0.5	0.7	1.8
MW-79	A	BICA	ORP	na	mV	nm	nm	nm	122.4	138.7	24.9	(24.3)	(10.6)	(100.8)
MW-79	A	BICA	pH	na	stnd unit	6.68	6.86	6.82	6.67	6.38	7.19	7.56	7.22	7.16
MW-79	A	BICA	Specific Conductance	na	µmhos/cm	nm	nm	nm	nm	nm	nm	6,650	5,770	6,670
MW-79	A	BICA	Temperature	na	°C	nm	nm	nm	nm	nm	nm	20.20	24.50	19.90
MW-79	A	BICA	Turbidity	na	NTU	nm	nm	nm	nm	nm	nm	3.10	4.10	5.90
MW-79A	B	BICA	Benzene	0.5	mg/L	<0.00034	<0.00034	<0.00047	<0.00047	0.00095	0.0026	0.0065	0.0022	0.0051
MW-79A	B	BICA	TDS	na	mg/L	11,900	8,850	8,520	11,500	10,700	8,400	9,620	10,600	11,400
MW-79A	B	BICA	D. O.	na	mg/L	2.5	1.8	0.9	0.7	0.6	0.6	0.5	0.7	2.2
MW-79A	B	BICA	ORP	na	mV	nm	nm	nm	(110.0)	(167.5)	(145.5)	(230.1)	(191.9)	(174.9)
MW-79A	B	BICA	pH	na	stnd unit	6.72	6.90	6.96	6.80	6.64	7.10	7.58	7.25	7.29
MW-79A	B	BICA	Specific Conductance	na	µmhos/cm	nm	nm	nm	nm	nm	nm	17,350	13,990	17,000
MW-79A	B	BICA	Temperature	na	°C	nm	nm	nm	nm	nm	nm	20.20	22.90	18.80
MW-79A	B	BICA	Turbidity	na	NTU	nm	nm	nm	nm	nm	nm	5.00	6.40	5.60
MW-80	A	BICA	Benzene	0.5	mg/L	<0.00034	<0.00034	<0.00047	<0.00047	<0.00047	<0.0003	<0.0003	<0.0004	<0.0004
MW-80	A	BICA	TDS	na	mg/L	12,600	11,100	9,960	10,900	10,000	8,400	8,950	9,020	9,480

Table VI.B.3.b - GROUNDWATER MONITORING SYSTEM RESULTS - BICA and SITE E PROGRAMS

Alon USA LP - Big Spring Refinery

Well No.	Screen	Program	Constituent	$^{GW}GW_{Class3}$ (mg/L)	Units	CURRENT PERMIT ANALYSIS								
						Jul-19	Jan-20	Jul-20	Jan-21	Jul-21	Jan-22	Jul-22	Jan-23	Jul-23
MW-76	A	BICA	Turbidity	na	NTU	4.90	5.80	5.50	5.50	7.50	7.10	7.50	6.20	7.30
MW-76A	B	BICA	Benzene	0.5	mg/L	<0.0004	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.00023	<0.00023	<0.00023
MW-76A	B	BICA	TDS	na	mg/L	687	689	684	684	602	684	749	758	724
MW-76A	B	BICA	D. O.	na	mg/L	3.8	5.2	4.2	4.2	6.7	5.4	6.5	6.7	6.7
MW-76A	B	BICA	ORP	na	mV	109.4	204.1	103.1	103.1	203.6	67.1	93.7	180.7	110.7
MW-76A	B	BICA	pH	na	stnd unit	7.07	6.62	6.93	6.93	6.83	6.89	6.68	6.70	6.71
MW-76A	B	BICA	Specific Conductance	na	µmhos/cm	895	907	918	918	1,007	865	93	1,112	1,034
MW-76A	B	BICA	Temperature	na	°C	25.6	20.6	24.9	24.9	19.7	26.6	23.2	15.8	22.4
MW-76A	B	BICA	Turbidity	na	NTU	7.00	8.10	7.00	7.00	6.10	7.50	6.20	2.10	6.50
MW-78	A	BICA	Benzene	0.5	mg/L	<0.0004	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.00023	<0.00023	<0.00023
MW-78	A	BICA	TDS	na	mg/L	4,310	4,520	4,540	4,540	4,630	5,410	6,380	4,580	1,600
MW-78	A	BICA	D. O.	na	mg/L	1.1	1.4	1.6	1.6	2.1	2.3	1.6	1.3	1.4
MW-78	A	BICA	ORP	na	mV	(79.3)	(112.1)	(116.5)	(116.5)	(93.7)	(81.7)	(75.8)	(19.9)	(39.3)
MW-78	A	BICA	pH	na	stnd unit	7.13	7.28	6.79	6.79	7.09	6.98	6.69	6.74	6.55
MW-78	A	BICA	Specific Conductance	na	µmhos/cm	5,260	5,850	6,300	6,300	6,880	8,760	10,430	7,900	8,670
MW-78	A	BICA	Temperature	na	°C	24.9	18.2	23.1	23.1	20.9	22.7	26.3	20.6	23.8
MW-78	A	BICA	Turbidity	na	NTU	3.10	5.80	2.40	2.40	2.80	2.10	2.70	5.30	4.90
MW-78A	B	BICA	Benzene	0.5	mg/L	<0.0004	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.00023	<0.00023	<0.00023
MW-78A	B	BICA	TDS	na	mg/L	4,810	5,010	4,420	4,420	4,280	4,040	4,370	3,260	3,480
MW-78A	B	BICA	D. O.	na	mg/L	0.9	1.2	0.8	0.8	1.9	1.4	1.6	1.2	1.2
MW-78A	B	BICA	ORP	na	mV	(70.7)	(104.8)	(110.6)	(110.6)	(92.0)	(105.7)	(88.3)	(47.1)	(59.2)
MW-78A	B	BICA	pH	na	stnd unit	7.23	7.22	7.14	7.14	7.35	7.27	7.06	7.12	6.89
MW-78A	B	BICA	Specific Conductance	na	µmhos/cm	6,540	7,090	6,820	6,820	6,510	7,050	7,500	6,210	8,030
MW-78A	B	BICA	Temperature	na	°C	24.3	18.3	22.9	22.9	20.6	22.3	25.9	20.7	24.0
MW-78A	B	BICA	Turbidity	na	NTU	3.90	3.70	2.40	2.40	2.70	2.60	4.20	6.00	7.00
MW-79	A	BICA	Benzene	0.5	mg/L	<0.0004	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.00023	<0.00023	0.00091
MW-79	A	BICA	TDS	na	mg/L	5,490	5,760	4,760	4,760	3,760	3,550	3,690	3,530	4,000
MW-79	A	BICA	D. O.	na	mg/L	0.7	1.0	0.6	0.6	1.7	1.6	1.7	1.5	1.5
MW-79	A	BICA	ORP	na	mV	(96.7)	(126.5)	(107.2)	(107.2)	(103.1)	(83.5)	(159.2)	(58.2)	(74.3)
MW-79	A	BICA	pH	na	stnd unit	6.99	7.10	6.91	6.91	7.23	7.27	6.96	6.96	6.83
MW-79	A	BICA	Specific Conductance	na	µmhos/cm	6,300	6,950	6,860	6,860	5,600	5,890	6,310	5,430	7,430
MW-79	A	BICA	Temperature	na	°C	23.1	18.4	22.8	22.8	20.2	21.7	26.1	18.8	24.4
MW-79	A	BICA	Turbidity	na	NTU	6.80	7.60	6.20	6.20	5.00	5.10	7.50	6.90	7.40
MW-79A	B	BICA	Benzene	0.5	mg/L	<0.0004	<0.0003	0.00062	0.00062	0.0008	<0.0003	0.00063	0.842	0.002
MW-79A	B	BICA	TDS	na	mg/L	13,200	12,200	11,200	11,200	10,600	11,500	11,700	7,800	5,960
MW-79A	B	BICA	D. O.	na	mg/L	0.9	1.1	0.7	0.7	1.7	1.7	1.8	1.4	2.0
MW-79A	B	BICA	ORP	na	mV	(133.7)	(171.3)	(174.5)	(174.5)	(169.9)	(153.4)	(152.1)	(60.4)	(93.4)
MW-79A	B	BICA	pH	na	stnd unit	7.00	7.09	6.93	6.93	7.19	7.10	6.85	6.93	6.56
MW-79A	B	BICA	Specific Conductance	na	µmhos/cm	15,800	15,880	16,390	16,390	15,140	17,810	18,280	14,800	17,540
MW-79A	B	BICA	Temperature	na	°C	24.9	18.5	23.8	23.8	19.8	21.7	26.5	18.8	25.7
MW-79A	B	BICA	Turbidity	na	NTU	6.10	8.40	5.80	5.80	7.10	6.70	4.90	6.00	6.00
MW-80	A	BICA	Benzene	0.5	mg/L	<0.0004	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.00023	<0.00023	<0.00023
MW-80	A	BICA	TDS	na	mg/L	1,080	10,600	8,840	8,840	7,560	8,100	7,210	5,870	5,720

Table VI.B.3.b - GROUNDWATER MONITORING SYSTEM RESULTS - BICA and SITE E PROGRAMS

Alon USA LP - Big Spring Refinery

Well No.	Screen	Program	Constituent	$^{GW}GW_{Class3}$ (mg/L)	Units	PRE-PERMIT ANALYSIS								
						Jul-10	Jan-11	Jul-11	Jan-12	Jul-12	Jan-13	Jul-13	Jan-14	Jul-14
MW-80	A	BICA	**D. O.**	**na**	**mg/L**	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-80	A	BICA	**ORP**	**na**	**mV**	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-80	A	BICA	**pH**	**na**	**stnd unit**	6.43	6.98	6.41	7.18	7.34	7.03	6.89	8.15	6.89
MW-80	A	BICA	**Specific Conductance**	**na**	**µmhos/cm**	26,000	26,900	21,700	21	19,800	1,910	2,020	21,100	15,900
MW-80	A	BICA	**Temperature**	**na**	**°C**	25.40	17.99	24.18	20.75	23.15	21.55	21.58	20.23	23.39
MW-80	A	BICA	**Turbidity**	**na**	**NTU**	137.00	0.00	0.00	0.10	29.30	0.00	30.40	5.30	281.00
MW-80A	B	BICA	**Benzene**	**0.5**	**mg/L**	<0.001	<0.001	<0.00025	<0.00025	<0.00025	<0.00034	<0.00034	<0.00034	<0.00034
MW-80A	B	BICA	**TDS**	**na**	**mg/L**	21,500	18,700	7,650	13,700	13,100	14,600	16,800	15,100	14,000
MW-80A	B	BICA	**D. O.**	**na**	**mg/L**	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-80A	B	BICA	**ORP**	**na**	**mV**	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-80A	B	BICA	**pH**	**na**	**stnd unit**	5.96	6.45	6.50	7.21	7.33	6.87	6.63	7.94	6.91
MW-80A	B	BICA	**Specific Conductance**	**na**	**µmhos/cm**	28,000	27,800	23,000	22	20,600	21,700	24,800	24,200	17,400
MW-80A	B	BICA	**Temperature**	**na**	**°C**	25.40	14.87	28.31	20.13	22.83	21.34	21.02	20.21	22.79
MW-80A	B	BICA	**Turbidity**	**na**	**NTU**	29	63.4	0	1	3	0	0	0	0
RW-106	A	BICA	**Benzene**	**0.5**	**mg/L**	PSH	PSH	PSH	PSH	PSH	PSH	PSH	PSH	PSH
RW-106	A	BICA	**1,2-DCA**	**0.5**	**mg/L**	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness
RW-106	A	BICA	**Arsenic**	**1**	**mg/L**	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet
RW-106	A	BICA	**TDS**	**na**	**mg/L**	1.61	1.24	2.8	3.43	3.83	2.44	0.01	0.04	0.14
RW-106	A	BICA	**D. O.**	**na**	**mg/L**	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-106	A	BICA	**ORP**	**na**	**mV**	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-106	A	BICA	**pH**	**na**	**stnd unit**	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-106	A	BICA	**Specific Conductance**	**na**	**µmhos/cm**	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-106	A	BICA	**Temperature**	**na**	**°C**	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-106	A	BICA	**Turbidity**	**na**	**NTU**	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-109	A	BICA	**Benzene**	**0.5**	**mg/L**	<0.001	<0.001	<0.00025	0.00039	<0.00025	<0.00034	<0.00034	<0.00034	<0.00034
MW-109	A	BICA	**TDS**	**na**	**mg/L**	7,870	7,480	7,360	6,480	6,500	5,860	6,190	6,530	6,160
MW-109	A	BICA	**D. O.**	**na**	**mg/L**	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-109	A	BICA	**ORP**	**na**	**mV**	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-109	A	BICA	**pH**	**na**	**stnd unit**	8.21	6.70	7.06	7.34	8.05	8.04	8.06	7.44	6.44
MW-109	A	BICA	**Specific Conductance**	**na**	**µmhos/cm**	13,300	11,600	11,700	12	9,830	9,490	9,720	10,300	8,030
MW-109	A	BICA	**Temperature**	**na**	**°C**	25.26	16.88	30.83	17.46	23.96	18.63	22.43	15.64	22.63
MW-109	A	BICA	**Turbidity**	**na**	**NTU**	14.70	0.00	6.90	0.00	28.50	0.00	0.00	16.10	0.00
MW-109A	B	BICA	**Benzene**	**0.5**	**mg/L**	<0.005	<0.001	<0.00025	0.00039	<0.00025	<0.00034	<0.00034	<0.00034	<0.00034
MW-109A	B	BICA	**TDS**	**na**	**mg/L**	7,520	7,340	7,400	5,800	6,230	5,580	6,100	5,960	6,120
MW-109A	B	BICA	**D. O.**	**na**	**mg/L**	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-109A	B	BICA	**ORP**	**na**	**mV**	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-109A	B	BICA	**pH**	**na**	**stnd unit**	7.19	6.75	6.91	7.27	7.85	5.25	8.01	7.41	26.74
MW-109A	B	BICA	**Specific Conductance**	**na**	**µmhos/cm**	13,300	11,400	11,300	11	10,400	8,750	9,480	9,330	8,780
MW-109A	B	BICA	**Temperature**	**na**	**°C**	25.97	19.67	26.28	18.76	21.44	20.58	21.32	18.49	26.74
MW-109A	B	BICA	**Turbidity**	**na**	**NTU**	6.4	0	0	0	17.8	5.6	0	39.8	0
RW-112	C	BICA	**Benzene**	**0.5**	**mg/L**	Off-Line	<0.001	<0.00025	<0.00025	Off-Line	<0.001	<0.00034	<0.00034	<0.00034
RW-112	C	BICA	**1,2-DCA**	**0.5**	**mg/L**	Off-Line	0.044	0.0034	0.0021	Off-Line	0.00097	0.00097	0.0011	0.00088
RW-112	C	BICA	**Arsenic**	**1**	**mg/L**	Off-Line	<0.1	0.02130	0.04280	Off-Line	0.03070	0.02780	0.02690	0.03270

Table VI.B.3.b - GROUNDWATER MONITORING SYSTEM RESULTS - BICA and SITE E PROGRAMS

Alon USA LP - Big Spring Refinery

Well No.	Screen	Program	Constituent	$^{GW}GW_{Class3}$ (mg/L)	Units	CURRENT PERMIT ANALYSIS								
						Mar-15	Jul-15	Jan-16	Jul-16	Jan-17	Jul-17	Jan-18	Jul-18	Jan-19
MW-80	A	BICA	D. O.	na	mg/L	2.2	1.7	0.9	0.6	0.5	0.8	0.6	0.7	1.8
MW-80	A	BICA	ORP	na	mV	nm	nm	nm	(101.1)	(80.4)	(58.1)	(114.2)	(153.6)	(130.7)
MW-80	A	BICA	pH	na	stnd unit	6.94	6.96	6.88	7.08	6.81	6.94	7.40	7.20	7.25
MW-80	A	BICA	Specific Conductance	na	µmhos/cm	nm	nm	nm	nm	nm	nm	14,000	10,700	13,220
MW-80	A	BICA	Temperature	na	°C	nm	nm	nm	nm	nm	nm	20.90	23.10	20.90
MW-80	A	BICA	Turbidity	na	NTU	nm	nm	nm	nm	nm	nm	5.70	3.90	5.50
MW-80A	B	BICA	Benzene	0.5	mg/L	<0.00034	<0.00034	<0.00047	<0.00047	<0.00047	<0.0003	<0.0003	<0.0004	<0.0004
MW-80A	B	BICA	TDS	na	mg/L	16,900	15,100	14,300	17,200	15,400	13,400	14,700	14,200	16,100
MW-80A	B	BICA	D. O.	na	mg/L	1.9	2.3	0.8	0.5	0.8	0.9	1.0	0.9	1.7
MW-80A	B	BICA	ORP	na	mV	nm	nm	nm	(111.2)	(106.9)	(71.7)	(137.9)	(217.7)	(247.9)
MW-80A	B	BICA	pH	na	stnd unit	6.48	6.77	6.74	6.78	6.31	6.75	7.07	7.03	7.04
MW-80A	B	BICA	Specific Conductance	na	µmhos/cm	nm	nm	nm	nm	nm	nm	23,200	19,560	22,200
MW-80A	B	BICA	Temperature	na	°C	nm	nm	nm	nm	nm	nm	20.40	22.50	20.60
MW-80A	B	BICA	Turbidity	na	NTU	nm	nm	nm	nm	nm	nm	2.8	4.8	4
RW-106	A	BICA	Benzene	0.5	mg/L	PSH	PSH	25.70	PSH	PSH	PSH	PSH	PSH	PSH
RW-106	A	BICA	1,2-DCA	0.5	mg/L	Thickness	Thickness	<0.31	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness
RW-106	A	BICA	Arsenic	1	mg/L	In Feet	In Feet	0.0619	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet
RW-106	A	BICA	TDS	na	mg/L	0.14	0.03	8200	0.30	Emulsion	2.40	3.30	3.71	3.00
RW-106	A	BICA	D. O.	na	mg/L	nm	nm	0.8	nm	nm	nm	nm	nm	nm
RW-106	A	BICA	ORP	na	mV	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-106	A	BICA	pH	na	stnd unit	nm	nm	7.0	nm	nm	nm	nm	nm	nm
RW-106	A	BICA	Specific Conductance	na	µmhos/cm	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-106	A	BICA	Temperature	na	°C	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-106	A	BICA	Turbidity	na	NTU	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-109	A	BICA	Benzene	0.5	mg/L	<0.00034	<0.00034	<0.00047	<0.00047	<0.00047	<0.0003	<0.0003	<0.0004	<0.0004
MW-109	A	BICA	TDS	na	mg/L	5,600	5,500	5,090	5,040	5,440	6,170	6,470	6,400	6,180
MW-109	A	BICA	D. O.	na	mg/L	1.4	0.6	0.6	0.6	0.6	0.2	0.8	1.2	1.1
MW-109	A	BICA	ORP	na	mV	nm	nm	nm	56.3	(87.2)	(95.2)	(41.1)	(55.0)	(113.2)
MW-109	A	BICA	pH	na	stnd unit	6.85	7.15	7.10	7.22	7.21	7.37	7.15	7.07	7.05
MW-109	A	BICA	Specific Conductance	na	µmhos/cm	nm	nm	nm	nm	nm	nm	8,840	8,120	8,420
MW-109	A	BICA	Temperature	na	°C	nm	nm	nm	nm	nm	nm	16.20	21.50	14.60
MW-109	A	BICA	Turbidity	na	NTU	nm	nm	nm	nm	nm	nm	16.20	3.60	4.10
MW-109A	B	BICA	Benzene	0.5	mg/L	<0.00034	<0.00034	<0.00047	<0.00047	<0.00047	<0.0003	<0.0003	<0.0004	<0.0004
MW-109A	B	BICA	TDS	na	mg/L	5,390	5,240	4,780	5,090	5,360	5,950	6,060	6,460	5,930
MW-109A	B	BICA	D. O.	na	mg/L	2.0	0.6	0.4	0.3	0.9	0.2	0.8	1.2	0.8
MW-109A	B	BICA	ORP	na	mV	nm	nm	nm	75.2	(17.0)	(33.7)	(16.8)	(29.1)	(75.1)
MW-109A	B	BICA	pH	na	stnd unit	7.30	7.14	7.06	7.18	7.10	7.34	7.07	7.06	6.98
MW-109A	B	BICA	Specific Conductance	na	µmhos/cm	nm	nm	nm	nm	nm	nm	8,450	8,150	8,000
MW-109A	B	BICA	Temperature	na	°C	nm	nm	nm	nm	nm	nm	18.30	20.00	16.60
MW-109A	B	BICA	Turbidity	na	NTU	nm	nm	nm	nm	nm	nm	2.6	1.6	2.6
RW-112	C	BICA	Benzene	0.5	mg/L	<0.00034	<0.00034	<0.00047	0.0014	0..12	0.00094	0.001	0.00067	0.00075
RW-112	C	BICA	1,2-DCA	0.5	mg/L	0.00072	0.00068	0.00077	0.0224	0.0394	0.0313	0.0319	0.0282	0.00079
RW-112	C	BICA	Arsenic	1	mg/L	0.03320	0.03330	0.03250	<0.00047	<0.00047	<0.0003	<0.0003	<0.0004	0.15900

Table VI.B.3.b - GROUNDWATER MONITORING SYSTEM RESULTS - BICA and SITE E PROGRAMS

Alon USA LP - Big Spring Refinery

Well No.	Screen	Program	Constituent	$^{GW}GW_{Class3}$ (mg/L)	Units	CURRENT PERMIT ANALYSIS								
						Jul-19	Jan-20	Jul-20	Jan-21	Jul-21	Jan-22	Jul-22	Jan-23	Jul-23
MW-80	A	BICA	D. O.	na	mg/L	1.3	1.6	1.2	1.2	1.1	1.3	1.9	2.0	1.9
MW-80	A	BICA	ORP	na	mV	(70.5)	(89.6)	(100.1)	(100.1)	(79.4)	(83.8)	(37.8)	(40.6)	(30.3)
MW-80	A	BICA	pH	na	stnd unit	7.04	7.19	6.98	6.98	7.13	7.12	7.00	7.02	6.87
MW-80	A	BICA	Specific Conductance	na	µmhos/cm	12,680	13,100	12,470	12,470	11,000	12,940	11,300	11,500	12,660
MW-80	A	BICA	Temperature	na	°C	23.2	21.8	23.0	23.0	20.2	21.9	26.1	18.3	22.8
MW-80	A	BICA	Turbidity	na	NTU	5.40	4.60	4.80	4.80	5.70	5.40	4.80	4.10	4.60
MW-80A	B	BICA	Benzene	0.5	mg/L	<0.0004	<0.0003	0.0003	0.0003	<0.0003	<0.0003	<0.00023	0.0023	<0.00023
MW-80A	B	BICA	TDS	na	mg/L	17,300	16,300	15,500	15,500	12,000	13,900	15,100	13,400	5,320
MW-80A	B	BICA	D. O.	na	mg/L	1.2	1.6	1.2	1.2	1.7	1.6	1.6	1.8	2.0
MW-80A	B	BICA	ORP	na	mV	(85.1)	(99.0)	(120.1)	(120.1)	(75.0)	(83.2)	(48.1)	(44.6)	(38.5)
MW-80A	B	BICA	pH	na	stnd unit	6.90	7.04	6.79	6.79	6.71	6.67	6.41	6.36	5.80
MW-80A	B	BICA	Specific Conductance	na	µmhos/cm	20,100	21,200	21,840	21,840	20,100	21,560	23,800	24,000	35,100
MW-80A	B	BICA	Temperature	na	°C	23.5	21.8	24.9	24.9	20.1	21.5	26.6	18.2	23.1
MW-80A	B	BICA	Turbidity	na	NTU	5.10	4.30	4.40	4.40	4.20	4.10	4.30	4.00	5.20
RW-106	A	BICA	Benzene	0.5	mg/L	PSH	PSH	PSH	PSH	32.4	PSH	PSH	PSH	PSH
RW-106	A	BICA	1,2-DCA	0.5	mg/L	Thickness	Thickness	Thickness	Thickness	<0.073	Thickness	Thickness	Thickness	Thickness
RW-106	A	BICA	Arsenic	1	mg/L	In Feet	In Feet	In Feet	In Feet	0.0509	In Feet	In Feet	In Feet	In Feet
RW-106	A	BICA	TDS	na	mg/L	0.93	0.05	0.75	1.20	5130.00	0.94	0.19	0.12	0.19
RW-106	A	BICA	D. O.	na	mg/L	nm	nm	nm	nm	1.1	nm	nm	nm	nm
RW-106	A	BICA	ORP	na	mV	nm	nm	nm	nm	(158.9)	nm	nm	nm	nm
RW-106	A	BICA	pH	na	stnd unit	nm	nm	nm	nm	6.1	nm	nm	nm	nm
RW-106	A	BICA	Specific Conductance	na	µmhos/cm	nm	nm	nm	nm	6,430	nm	nm	nm	nm
RW-106	A	BICA	Temperature	na	°C	nm	nm	nm	nm	24.00	nm	nm	nm	nm
RW-106	A	BICA	Turbidity	na	NTU	nm	nm	nm	nm	13.9	nm	nm	nm	nm
MW-109	A	BICA	Benzene	0.5	mg/L	<0.0004	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.00023	<0.00023	<0.00023
MW-109	A	BICA	TDS	na	mg/L	6,020	5,630	5,240	5,240	4,930	4,710	4,410	2,840	4,140
MW-109	A	BICA	D. O.	na	mg/L	1.2	1.1	1.0	1.0	1.1	1.4	0.7	1.1	0.9
MW-109	A	BICA	ORP	na	mV	(119.0)	48.9	(108.6)	(108.6)	(9.8)	(34.1)	(125.8)	(64.9)	(14.4)
MW-109	A	BICA	pH	na	stnd unit	7.02	7.15	7.18	7.18	7.17	7.13	7.21	7.35	7.03
MW-109	A	BICA	Specific Conductance	na	µmhos/cm	7,730	8,150	12,150	12,150	10,540	10,650	6,270	6,910	8,820
MW-109	A	BICA	Temperature	na	°C	23.2	17.9	23.4	23.4	16.5	21.6	24.4	17.5	25.1
MW-109	A	BICA	Turbidity	na	NTU	2.10	1.20	4.60	4.60	14.40	14.50	10.60	5.90	3.40
MW-109A	B	BICA	Benzene	0.5	mg/L	<0.0004	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.00023	<0.00023	<0.00023
MW-109A	B	BICA	TDS	na	mg/L	5,970	5,450	5,100	5,100	4,800	4,720	4,390	4,000	4,400
MW-109A	B	BICA	D. O.	na	mg/L	1.3	1.1	0.7	0.7	1.3	1.3	0.8	0.8	0.9
MW-109A	B	BICA	ORP	na	mV	(45.3)	46.7	(39.8)	(39.8)	9.2	10.2	(59.8)	(42.1)	(37.8)
MW-109A	B	BICA	pH	na	stnd unit	7.00	7.08	7.15	7.15	7.04	7.02	7.16	7.23	7.00
MW-109A	B	BICA	Specific Conductance	na	µmhos/cm	7,660	8,000	12,010	12,010	10,500	10,300	6,130	6,760	8,720
MW-109A	B	BICA	Temperature	na	°C	23.9	19.9	22.9	22.9	18.1	21.1	22.3	19.5	25.2
MW-109A	B	BICA	Turbidity	na	NTU	2.80	5.00	2.00	2.00	4.80	6.70	8.70	5.90	4.20
RW-112	C	BICA	Benzene	0.5	mg/L	0.00068	<0.0003	0.0011	0.0011	<0.0003	<0.00030	<0.00023	<0.00023	<0.00023
RW-112	C	BICA	1,2-DCA	0.5	mg/L	0.0024	<0.00037	<0.00037	<0.00037	<0.00037	<0.00037	<0.00041	<0.00041	<0.00041
RW-112	C	BICA	Arsenic	1	mg/L	0.28000	0.02530	0.10100	0.10100	0.03430	0.04040	0.03740	0.03700	0.10000

Table VI.B.3.b - GROUNDWATER MONITORING SYSTEM RESULTS - BICA and SITE E PROGRAMS

Alon USA LP - Big Spring Refinery

Well No.	Screen	Program	Constituent	$^{GW}GW_{Class3}$ (mg/L)	Units	PRE-PERMIT ANALYSIS								
						Jul-10	Jan-11	Jul-11	Jan-12	Jul-12	Jan-13	Jul-13	Jan-14	Jul-14
RW-112	C	BICA	TDS	na	mg/L	Off-Line	12,200	4,200	4,590	Off-Line	6,400	5,730	5,700	5,180
RW-112	C	BICA	D. O.	na	mg/L	Off-Line	nm	nm	nm	Off-Line	nm	nm	nm	nm
RW-112	C	BICA	ORP	na	mV	Off-Line	nm	nm	nm	Off-Line	nm	nm	nm	nm
RW-112	C	BICA	pH	na	stnd unit	Off-Line	6.64	7.22	7.46	Off-Line	7.43	7.24	7.14	6.28
RW-112	C	BICA	Specific Conductance	na	µmhos/cm	Off-Line	20,100	6,890	8,000	Off-Line	9,840	8,560	9	7,390
RW-112	C	BICA	Temperature	na	°C	Off-Line	14.48	23.17	21.61	Off-Line	19.75	21.17	19.90	21.81
RW-112	C	BICA	Turbidity	na	NTU	Off-Line	0.00	0.00	0.00	Off-Line	0.00	1.00	2.00	0.00
MW-125	A	BICA	Benzene	0.5	mg/L	<0.001	<0.001	<0.00025	<0.00025	<0.00025	0.0025	<0.00034	<0.00034	<0.00034
MW-125	A	BICA	TDS	na	mg/L	6,860	4,880	4,090	5,110	5,060	5,570	5,770	5,880	5,600
MW-125	A	BICA	D. O.	na	mg/L	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-125	A	BICA	ORP	na	mV	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-125	A	BICA	pH	na	stnd unit	8.36	7.72	6.92	7.29	7.49	7.13	6.77	6.54	6.01
MW-125	A	BICA	Specific Conductance	na	µmhos/cm	9,351	7,490	7,110	9	8,370	8,300	7,260	898	7,340
MW-125	A	BICA	Temperature	na	°C	23.31	21.82	27.93	20.09	22.23	20.78	21.69	19.04	22.33
MW-125	A	BICA	Turbidity	na	NTU	1.32	0.00	0.00	0.00	0.00	0.00	0.00	118.00	0.00
MW-125A	B	BICA	Benzene	0.5	mg/L	<0.001	<0.001	<0.00025	<0.00025	0.00025	<0.00034	<0.00034	<0.00034	<0.00034
MW-125A	B	BICA	TDS	na	mg/L	4,880	4,180	3,260	3,920	4,400	4,720	4,290	4,440	4,740
MW-125A	B	BICA	D. O.	na	mg/L	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-125A	B	BICA	ORP	na	mV	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-125A	B	BICA	pH	na	stnd unit	8.56	6.84	7.10	7.44	7.52	7.15	7.06	6.54	6.46
MW-125A	B	BICA	Specific Conductance	na	µmhos/cm	5,616	6,230	5,690	7	6,710	6,880	6,530	6,950	5,500
MW-125A	B	BICA	Temperature	na	°C	23.89	23.56	26.35	19.70	22.29	20.78	22.76	19.38	21.82
MW-125A	B	BICA	Turbidity	na	NTU	2.87	4.36	0.00	0.00	1.00	0.00	0.00	71.40	0.00
RW-141	C	BICA	Benzene	0.5	mg/L	<0.001	<0.001	Off-Line	<0.00025	Off-Line	Off-Line	Off-Line	Off-Line	Off-Line
RW-141	C	BICA	1,2-DCA	0.5	mg/L	0.035	0.068	Off-Line	0.026	Off-Line	Off-Line	Off-Line	Off-Line	Off-Line
RW-141	C	BICA	Arsenic	1	mg/L	0.114	<0.1	Off-Line	0.0287	Off-Line	Off-Line	Off-Line	Off-Line	Off-Line
RW-141	C	BICA	TDS	na	mg/L	19100	19100	Off-Line	8060	Off-Line	Off-Line	Off-Line	Off-Line	Off-Line
RW-141	C	BICA	D. O.	na	mg/L	nm	nm	Offline	nm	Off-Line	Off-Line	Off-Line	Off-Line	Off-Line
RW-141	C	BICA	ORP	na	mV	nm	nm	Offline	nm	Off-Line	Off-Line	Off-Line	Off-Line	Off-Line
RW-141	C	BICA	pH	na	stnd unit	7.28	7.75	Offline	7.73	Off-Line	Off-Line	Off-Line	Off-Line	Off-Line
RW-141	C	BICA	Specific Conductance	na	µmhos/cm	28,200	28,500	Offline	13	Off-Line	Off-Line	Off-Line	Off-Line	Off-Line
RW-141	C	BICA	Temperature	na	°C	31.94	13.10	Offline	12.09	Off-Line	Off-Line	Off-Line	Off-Line	Off-Line
RW-141	C	BICA	Turbidity	na	NTU	58.90	16.20	Offline	54.90	Off-Line	Off-Line	Off-Line	Off-Line	Off-Line
RW-142	C	BICA	Benzene	0.5	mg/L	<0.001	<0.001	<0.00025	<0.00025	Off-Line	Off-Line	Off-Line	Off-Line	Off-Line
RW-142	C	BICA	1,2-DCA	0.5	mg/L	0.014	0.01	0.014	0.0067	Off-Line	Off-Line	Off-Line	Off-Line	Off-Line
RW-142	C	BICA	Arsenic	1	mg/L	0.0152	<0.02	0.0348	0.0166	Off-Line	Off-Line	Off-Line	Off-Line	Off-Line
RW-142	C	BICA	TDS	na	mg/L	7,650	8,360	7,460	6,500	Off-Line	Off-Line	Off-Line	Off-Line	Off-Line
RW-142	C	BICA	D. O.	na	mg/L	nm	nm	nm	nm	Off-Line	Off-Line	Off-Line	Off-Line	Off-Line
RW-142	C	BICA	ORP	na	mV	nm	nm	nm	nm	Off-Line	Off-Line	Off-Line	Off-Line	Off-Line
RW-142	C	BICA	pH	na	stnd unit	7.10	8.81	6.82	8.24	Off-Line	Off-Line	Off-Line	Off-Line	Off-Line
RW-142	C	BICA	Specific Conductance	na	µmhos/cm	13,300	14,900	12,800	11	Off-Line	Off-Line	Off-Line	Off-Line	Off-Line
RW-142	C	BICA	Temperature	na	°C	25.41	21.97	24.00	25.09	Off-Line	Off-Line	Off-Line	Off-Line	Off-Line
RW-142	C	BICA	Turbidity	na	NTU	151.00	5.00	0.00	23.10	Off-Line	Off-Line	Off-Line	Off-Line	Off-Line

Table VI.B.3.b - GROUNDWATER MONITORING SYSTEM RESULTS - BICA and SITE E PROGRAMS

Alon USA LP - Big Spring Refinery

Well No.	Screen	Program	Constituent	$^{GW}GW_{Class3}$ (mg/L)	Units	CURRENT PERMIT ANALYSIS								
						Mar-15	Jul-15	Jan-16	Jul-16	Jan-17	Jul-17	Jan-18	Jul-18	Jan-19
RW-112	C	BICA	TDS	na	mg/L	4,680	5,350	5,560	5,820	5,530	5,970	6,030	5,920	4,680
RW-112	C	BICA	D. O.	na	mg/L	3.1	5.6	3.7	4.1	4.6	5.2	5.0	2.7	2.4
RW-112	C	BICA	ORP	na	mV	nm	nm	nm	15.5	62.4	58.3	86.3	(68.6)	(98.6)
RW-112	C	BICA	pH	na	stnd unit	7.46	6.93	6.74	7.79	7.89	7.06	7.11	7.16	7.03
RW-112	C	BICA	Specific Conductance	na	µmhos/cm	nm	nm	nm	nm	nm	nm	7,962	11,590	10,380
RW-112	C	BICA	Temperature	na	°C	nm	nm	nm	nm	nm	nm	19.80	24.20	18.60
RW-112	C	BICA	Turbidity	na	NTU	nm	nm	nm	nm	nm	nm	2.10	1.70	1.90
MW-125	A	BICA	Benzene	0.5	mg/L	<0.00034	<0.00034	<0.00047	<0.00047	<0.00047	<0.0003	<0.0003	<0.0004	<0.0004
MW-125	A	BICA	TDS	na	mg/L	4,260	4,420	4,190	6,180	5,660	6,160	5,650	6,200	6,620
MW-125	A	BICA	D. O.	na	mg/L	2.6	4.9	4.1	3.9	4.3	2.6	2.6	2.3	2.6
MW-125	A	BICA	ORP	na	mV	nm	nm	nm	100.5	36.6	29.1	21.1	25.9	89.9
MW-125	A	BICA	pH	na	stnd unit	7.25	7.21	7.36	7.27	7.18	7.59	7.08	7.43	7.29
MW-125	A	BICA	Specific Conductance	na	µmhos/cm	nm	nm	nm	nm	nm	nm	8,220	7,200	8,050
MW-125	A	BICA	Temperature	na	°C	nm	nm	nm	nm	nm	nm	20.70	22.80	19.60
MW-125	A	BICA	Turbidity	na	NTU	nm	nm	nm	nm	nm	nm	4.20	3.70	4.60
MW-125A	B	BICA	Benzene	0.5	mg/L	<0.00034	<0.00034	<0.00047	<0.00047	<0.00047	<0.0003	<0.0003	<0.0004	<0.0004
MW-125A	B	BICA	TDS	na	mg/L	4,380	4,510	4,520	5,710	6,150	6,760	6,220	7,320	7,340
MW-125A	B	BICA	D. O.	na	mg/L	2.8	4.0	2.6	2.3	2.3	1.6	1.5	1.5	2.1
MW-125A	B	BICA	ORP	na	mV	nm	nm	nm	104.0	55.5	44.5	40.1	42.6	99.3
MW-125A	B	BICA	pH	na	stnd unit	7.17	7.27	7.23	7.14	6.97	7.26	7.31	7.32	7.29
MW-125A	B	BICA	Specific Conductance	na	µmhos/cm	nm	nm	nm	nm	nm	nm	8,960	7,770	8,850
MW-125A	B	BICA	Temperature	na	°C	nm	nm	nm	nm	nm	nm	20.90	22.30	19.30
MW-125A	B	BICA	Turbidity	na	NTU	nm	nm	nm	nm	nm	nm	7.40	6.70	9.50
RW-141	C	BICA	Benzene	0.5	mg/L	<0.00034	<0.00034	<0.00047	<0.00061	0.0447	0.0297	0.0471	0.041	<0.0004
RW-141	C	BICA	1,2-DCA	0.5	mg/L	<0.00035	0.0623	0.0202	0.0191	0.0319	0.0713	0.0388	0.0447	0.00085
RW-141	C	BICA	Arsenic	1	mg/L	0.0216	0.0931	0.0675	<0.00047	<0.00047	<0.0003	<0.0003	<0.0004	0.0208
RW-141	C	BICA	TDS	na	mg/L	2200	18100	13800	3470	17700	13600	15500	2160	3090
RW-141	C	BICA	D. O.	na	mg/L	2.7	1.7	1.6	2.3	2.1	1.2	1.3	1.5	1.9
RW-141	C	BICA	ORP	na	mV	nm	nm	nm	186.1	(24.5)	85.5	34.0	(77.8)	6.1
RW-141	C	BICA	pH	na	stnd unit	7.05	6.63	6.28	7.42	7.46	7.03	6.85	6.55	6.82
RW-141	C	BICA	Specific Conductance	na	µmhos/cm	nm	nm	nm	nm	nm	nm	23,090	32,050	32,190
RW-141	C	BICA	Temperature	na	°C	nm	nm	nm	nm	nm	nm	22.40	25.10	18.10
RW-141	C	BICA	Turbidity	na	NTU	nm	nm	nm	nm	nm	nm	2.80	3.30	3.90
RW-142	C	BICA	Benzene	0.5	mg/L	<0.00034	<0.00034	<0.00047	0.0029	0.0038	0.003	0.0035	0.0031	<0.0004
RW-142	C	BICA	1,2-DCA	0.5	mg/L	0.0112	0.0067	0.0047	0.0397	0.0526	0.04	0.0342	0.0436	0.0013
RW-142	C	BICA	Arsenic	1	mg/L	0.0803	0.0333	0.028	<0.00047	<0.00047	<0.0003	<0.0003	<0.0004	0.0435
RW-142	C	BICA	TDS	na	mg/L	13,200	5,870	5,500	5,080	5,400	5,060	5,840	6,280	5,030
RW-142	C	BICA	D. O.	na	mg/L	3.4	1.4	1.5	1.9	1.0	1.4	1.4	2.4	2.8
RW-142	C	BICA	ORP	na	mV	nm	nm	nm	180.8	(11.8)	38.6	(75.6)	(121.1)	(102.1)
RW-142	C	BICA	pH	na	stnd unit	7.49	6.40	6.63	6.38	7.40	6.42	6.65	6.94	6.96
RW-142	C	BICA	Specific Conductance	na	µmhos/cm	nm	nm	nm	nm	nm	nm	7,960	12,120	11,070
RW-142	C	BICA	Temperature	na	°C	nm	nm	nm	nm	nm	nm	21.30	25.40	20.50
RW-142	C	BICA	Turbidity	na	NTU	nm	nm	nm	nm	nm	nm	5.90	4.10	3.20

Table VI.B.3.b - GROUNDWATER MONITORING SYSTEM RESULTS - BICA and SITE E PROGRAMS

Alon USA LP - Big Spring Refinery

Well No.	Screen	Program	Constituent	$^{GW}GW_{Class3}$ (mg/L)	Units	CURRENT PERMIT ANALYSIS								
						Jul-19	Jan-20	Jul-20	Jan-21	Jul-21	Jan-22	Jul-22	Jan-23	Jul-23
RW-112	C	BICA	TDS	na	mg/L	6,410	2,460	3,060	3,060	3,330	3,250	2,940	2,890	3,750
RW-112	C	BICA	D. O.	na	mg/L	1.9	2.0	1.3	1.3	3.1	3.9	3.6	4.4	5.3
RW-112	C	BICA	ORP	na	mV	(137.9)	(150.2)	(162.1)	(162.1)	(72.8)	(67.2)	(84.2)	(51.6)	(112.6)
RW-112	C	BICA	pH	na	stnd unit	7.07	7.13	7.36	7.36	7.28	7.19	6.89	7.06	7.38
RW-112	C	BICA	Specific Conductance	na	µmhos/cm	10,490	6,382	5,470	5,470	6,120	6,380	5,490	5,110	7,430
RW-112	C	BICA	Temperature	na	°C	25.7	19.8	23.9	23.9	18.7	20.9	21.9	20.3	39.3
RW-112	C	BICA	Turbidity	na	NTU	1.60	2.00	3.40	3.40	2.10	1.90	4.40	2.60	2.10
MW-125	A	BICA	Benzene	0.5	mg/L	<0.0004	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.00023	<0.00023	<0.00023
MW-125	A	BICA	TDS	na	mg/L	7,580	7,850	6,980	6,980	6,190	6,380	7,410	7,540	5,620
MW-125	A	BICA	D. O.	na	mg/L	2.0	2.2	1.3	1.3	1.6	1.8	2.0	1.8	1.9
MW-125	A	BICA	ORP	na	mV	72.1	25.8	79.0	79.0	16.3	51.1	85.5	101.4	126.4
MW-125	A	BICA	pH	na	stnd unit	7.03	7.01	6.90	6.90	7.33	7.21	6.86	6.86	6.62
MW-125	A	BICA	Specific Conductance	na	µmhos/cm	7,800	8,490	8,800	8,800	8,740	10,190	10,360	9,280	11,300
MW-125	A	BICA	Temperature	na	°C	21.3	18.6	22.3	22.3	20.4	21.8	26.6	18.2	22.3
MW-125	A	BICA	Turbidity	na	NTU	6.50	7.10	7.90	7.90	8.10	7.60	7.30	6.40	5.00
MW-125A	B	BICA	Benzene	0.5	mg/L	<0.0004	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.00023	<0.00023	<0.00023
MW-125A	B	BICA	TDS	na	mg/L	7,560	7,680	7,140	7,140	6,570	6,680	7,160	5,590	6,180
MW-125A	B	BICA	D. O.	na	mg/L	1.9	2.0	1.8	1.8	2.1	1.9	1.8	1.5	1.9
MW-125A	B	BICA	ORP	na	mV	94.6	44.8	76.1	76.1	47.2	60.1	90.7	106.1	121.3
MW-125A	B	BICA	pH	na	stnd unit	7.02	6.93	6.85	6.85	7.16	7.16	6.81	6.83	6.60
MW-125A	B	BICA	Specific Conductance	na	µmhos/cm	8,110	8,890	9,060	9,060	8,870	10,250	10,260	9,270	11,330
MW-125A	B	BICA	Temperature	na	°C	21.5	18.8	23.0	23.0	20.4	22.0	27.3	18.2	22.7
MW-125A	B	BICA	Turbidity	na	NTU	6.00	5.60	5.00	5.00	6.10	5.60	6.60	7.10	6.40
RW-141	C	BICA	Benzene	0.5	mg/L	<0.0004	<0.0003	<0.0003	<0.0003	<0.0003	<0.00030	<0.00023	<0.00023	<0.00023
RW-141	C	BICA	1,2-DCA	0.5	mg/L	0.0223	0.0436	0.026	0.026	0.0154	0.0141	0.0579	<0.00041	0.0086
RW-141	C	BICA	Arsenic	1	mg/L	0.0642	0.165	<0.012	<0.012	0.021	0.0492	0.119	0.0281	0.0489
RW-141	C	BICA	TDS	na	mg/L	12300	16000	11600	11600	10700	11000	13000	2980	8200
RW-141	C	BICA	D. O.	na	mg/L	1.5	1.7	1.9	1.9	2.2	2.7	3.0	3.8	3.2
RW-141	C	BICA	ORP	na	mV	(47.1)	(190.6)	(84.7)	(84.7)	(94.5)	(91.6)	(109.7)	(14.1)	(41.3)
RW-141	C	BICA	pH	na	stnd unit	6.75	6.94	6.87	6.87	6.80	6.83	6.85	6.73	6.87
RW-141	C	BICA	Specific Conductance	na	µmhos/cm	18,370	20,620	15,730	15,730	9,830	9,070	13,310	4,910	15,640
RW-141	C	BICA	Temperature	na	°C	23.9	18.5	23.7	23.7	19.5	20.9	21.9	15.7	26.2
RW-141	C	BICA	Turbidity	na	NTU	3.10	71.40	2.80	2.80	2.50	2.10	1.90	1.50	2.80
RW-142	C	BICA	Benzene	0.5	mg/L	<0.0004	<0.0003	<0.0003	<0.0003	<0.0003	<0.00030	<0.00023	<0.00023	<0.00023
RW-142	C	BICA	1,2-DCA	0.5	mg/L	0.00072	0.0011	0.0004	0.0004	0.00065	0.00038	0.00081	<0.00041	<0.00041
RW-142	C	BICA	Arsenic	1	mg/L	0.0732	0.0505	0.0707	0.0707	0.0369	0.0726	0.0475	0.0668	0.0298
RW-142	C	BICA	TDS	na	mg/L	4,790	4,930	4,380	4,380	4,440	4,010	3,680	2,780	4,440
RW-142	C	BICA	D. O.	na	mg/L	2.2	2.0	2.8	2.8	2.5	3.4	3.0	3.7	3.5
RW-142	C	BICA	ORP	na	mV	18.0	(17.1)	53.6	53.6	(53.4)	(91.2)	(99.7)	(64.8)	(82.2)
RW-142	C	BICA	pH	na	stnd unit	6.97	7.01	7.13	7.13	7.03	6.97	6.93	7.00	7.06
RW-142	C	BICA	Specific Conductance	na	µmhos/cm	9,721	7,142	6,310	6,310	6,840	6,580	6,610	5,570	5,050
RW-142	C	BICA	Temperature	na	°C	24.9	19.7	24.7	24.7	20.8	22.7	23.0	19.3	23.4
RW-142	C	BICA	Turbidity	na	NTU	2.60	2.30	2.00	2.00	1.70	2.00	2.40	2.10	1.70

Table VI.B.3.b - GROUNDWATER MONITORING SYSTEM RESULTS - BICA and SITE E PROGRAMS

Alon USA LP - Big Spring Refinery

Well No.	Screen	Program	Constituent	$^{GW}GW_{Class3}$ (mg/L)	Units	PRE-PERMIT ANALYSIS								
						Jul-10	Jan-11	Jul-11	Jan-12	Jul-12	Jan-13	Jul-13	Jan-14	Jul-14
RW-144	C	BICA	**Benzene**	**0.5**	mg/L	0.002	Off-Line	0.0155	Off-Line	Off-Line	<0.001	<0.00034	Off-Line	<0.00034
RW-144	C	BICA	**1,2-DCA**	**0.5**	mg/L	0.0037	Off-Line	0.0032	Off-Line	Off-Line	0.0014	0.0082	Off-Line	0.0041
RW-144	C	BICA	**Arsenic**	**1**	mg/L	0.0053	Off-Line	0.0953	Off-Line	Off-Line	0.0104	0.0083	Off-Line	0.0081
RW-144	C	BICA	**TDS**	**na**	mg/L	14,400	Off-Line	12,700	Off-Line	Off-Line	12,100	16,400	Off-Line	13,500
RW-144	C	BICA	**D. O.**	**na**	mg/L	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-144	C	BICA	**ORP**	**na**	mV	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-144	C	BICA	**pH**	**na**	stnd unit	6.95	Off-Line	7.20	Off-Line	Off-Line	7.07	6.67	Off-Line	22.71
RW-144	C	BICA	**Specific Conductance**	**na**	µmhos/cm	17,900	Off-Line	19,300	Off-Line	Off-Line	14,700	23,300	Off-Line	18,000
RW-144	C	BICA	**Temperature**	**na**	°C	22.43	Off-Line	32.14	Off-Line	Off-Line	19.80	21.74	Off-Line	22.71
RW-144	C	BICA	**Turbidity**	**na**	NTU	27.00	Off-Line	0.00	Off-Line	Off-Line	1.66	0.00	Off-Line	0.00
RW-145	C	BICA	**Benzene**	**0.5**	mg/L	0.0021	0.082	0.00032	<0.00025	Off-Line	Off-Line	Off-Line	0.00032	<0.00025
RW-145	C	BICA	**1,2-DCA**	**0.5**	mg/L	0.0048	0.034	0.0016	0.0106	Off-Line	Off-Line	Off-Line	0.0016	0.0106
RW-145	C	BICA	**Arsenic**	**1**	mg/L	0.0079	<0.1	0.0096	0.0152	Off-Line	Off-Line	Off-Line	0.0096	0.0152
RW-145	C	BICA	**TDS**	**na**	mg/L	15,800	15,500	11,800	11,000	Off-Line	Off-Line	Off-Line	11,800	11,000
RW-145	C	BICA	**D. O.**	**na**	mg/L	nm	nm	nm	nm	Off-Line	Off-Line	Off-Line	nm	nm
RW-145	C	BICA	**ORP**	**na**	mV	nm	nm	nm	nm	Off-Line	Off-Line	Off-Line	nm	nm
RW-145	C	BICA	**pH**	**na**	stnd unit	7.06	7.66	7.18	7.78	Off-Line	Off-Line	Off-Line	7.18	7.78
RW-145	C	BICA	**Specific Conductance**	**na**	µmhos/cm	20,400	14,900	15,000	17	Off-Line	Off-Line	Off-Line	nm	nm
RW-145	C	BICA	**Temperature**	**na**	°C	29.00	19.90	25.49	12.30	Off-Line	Off-Line	Off-Line	nm	nm
RW-145	C	BICA	**Turbidity**	**na**	NTU	23.81	5.78	0.00	0.00	Off-Line	Off-Line	Off-Line	nm	nm
RW-146	C	BICA	**Benzene**	**0.5**	mg/L	Off-Line	Off-Line	Off-Line	0.0244	Off-Line	<0.001	0.0154	0.104	0.0032
RW-146	C	BICA	**1,2-DCA**	**0.5**	mg/L	Off-Line	Off-Line	Off-Line	0.0209	Off-Line	0.015	0.0178	0.0339	0.0145
RW-146	C	BICA	**Arsenic**	**1**	mg/L	Off-Line	Off-Line	Off-Line	0.016	Off-Line	0.0128	0.0072	0.009	0.0337
RW-146	C	BICA	**TDS**	**na**	mg/L	Off-Line	Off-Line	Off-Line	16,000	Off-Line	18,500	14,700	14,900	13,200
RW-146	C	BICA	**D. O.**	**na**	mg/L	Off-Line	Off-Line	Off-Line	nm	Off-Line	nm	nm	nm	nm
RW-146	C	BICA	**ORP**	**na**	mV	Off-Line	Off-Line	Off-Line	nm	Off-Line	nm	nm	nm	nm
RW-146	C	BICA	**pH**	**na**	stnd unit	Off-Line	Off-Line	Off-Line	6.99	Off-Line	6.67	6.53	6.83	6.98
RW-146	C	BICA	**Specific Conductance**	**na**	µmhos/cm	Off-Line	Off-Line	Off-Line	27,100	Off-Line	26,100	20,800	22,700	16,100
RW-146	C	BICA	**Temperature**	**na**	°C	Off-Line	Off-Line	Off-Line	20.69	Off-Line	21.03	21.85	18.55	29.43
RW-146	C	BICA	**Turbidity**	**na**	NTU	Off-Line	Off-Line	Off-Line	84.70	Off-Line	2.08	10.80	227.00	16.00
RW-147	C	BICA	**Benzene**	**0.5**	mg/L	Off-Line	Off-Line	Off-Line	0.0089	Off-Line	<0.001	0.0202	0.224	0.0205
RW-147	C	BICA	**1,2-DCA**	**0.5**	mg/L	Off-Line	Off-Line	Off-Line	0.0737	Off-Line	0.0601	0.0472	0.0556	0.0222
RW-147	C	BICA	**Arsenic**	**1**	mg/L	Off-Line	Off-Line	Off-Line	0.0127	Off-Line	0.0077	0.0099	0.0124	0.0139
RW-147	C	BICA	**TDS**	**na**	mg/L	Off-Line	Off-Line	Off-Line	12,100	Off-Line	12,100	12,900	14,300	16,600
RW-147	C	BICA	**D. O.**	**na**	mg/L	Off-Line	Off-Line	Off-Line	nm	Off-Line	nm	nm	nm	nm
RW-147	C	BICA	**ORP**	**na**	mV	Off-Line	Off-Line	Off-Line	nm	Off-Line	nm	nm	nm	nm
RW-147	C	BICA	**pH**	**na**	stnd unit	Off-Line	Off-Line	Off-Line	7.04	Off-Line	6.59	6.52	6.70	6.10
RW-147	C	BICA	**Specific Conductance**	**na**	µmhos/cm	Off-Line	Off-Line	Off-Line	20,200	Off-Line	15,700	19,800	23	22,400
RW-147	C	BICA	**Temperature**	**na**	°C	Off-Line	Off-Line	Off-Line	20.39	Off-Line	21.33	21.88	19.85	22.56
RW-147	C	BICA	**Turbidity**	**na**	NTU	Off-Line	Off-Line	Off-Line	4.05	Off-Line	4.71	45.60	202.00	23.80
IW-149	A	BICA	**Benzene**	**0.5**	mg/L	1.2	0.86	0.987	ns	0.2	0.0237	0.0018	0.0043	0.0081
IW-149	A	BICA	**TDS**	**na**	mg/L	29,400	33,800	33,000	ns	31,500	32,200	29,900	26,500	27,100
IW-149	A	BICA	**D. O.**	**na**	mg/L	nm	nm	nm	nm	nm	nm	nm	nm	nm
IW-149	A	BICA	**ORP**	**na**	mV	nm	nm	nm	nm	nm	nm	nm	nm	nm

Table VI.B.3.b - GROUNDWATER MONITORING SYSTEM RESULTS - BICA and SITE E PROGRAMS

Alon USA LP - Big Spring Refinery

Well No.	Screen	Program	Constituent	$^{GW}GW_{Class3}$ (mg/L)	Units	CURRENT PERMIT ANALYSIS								
						Mar-15	Jul-15	Jan-16	Jul-16	Jan-17	Jul-17	Jan-18	Jul-18	Jan-19
RW-144	C	BICA	Benzene	0.5	mg/L	0.00089	<0.00034	<0.00047	<0.00061	<0.00061	<0.0003	<0.0003	0.00093	<0.0004
RW-144	C	BICA	1,2-DCA	0.5	mg/L	0.0023	<0.00035	0.0051	0.0075	0.001	0.01	0.0126	0.0094	<0.0004
RW-144	C	BICA	Arsenic	1	mg/L	0.0225	0.0089	0.0037	<0.00047	<0.00047	<0.0003	<0.0003	<0.0004	0.0125
RW-144	C	BICA	TDS	na	mg/L	11,200	5,790	9,580	7,720	6,480	6,960	5,990	7,100	6,730
RW-144	C	BICA	D. O.	na	mg/L	1.5	1.9	4.0	4.4	2.2	3.0	2.9	1.3	1.7
RW-144	C	BICA	ORP	na	mV	nm	nm	nm	139.4	138.2	176.4	110.2	123.7	135.1
RW-144	C	BICA	pH	na	stnd unit	6.46	6.25	6.53	7.81	7.79	6.11	5.86	6.48	6.63
RW-144	C	BICA	Specific Conductance	na	µmhos/cm	nm	nm	nm	nm	nm	nm	7,220	12,210	11,180
RW-144	C	BICA	Temperature	na	°C	nm	nm	nm	nm	nm	nm	19.40	24.40	20.20
RW-144	C	BICA	Turbidity	na	NTU	nm	nm	nm	nm	nm	nm	2.60	2.10	1.80
RW-145	C	BICA	Benzene	0.5	mg/L	<0.00034	0.0055	0.0509	<0.00061	0.0073	0.006	0.001	<0.0004	<0.0004
RW-145	C	BICA	1,2-DCA	0.5	mg/L	<0.00035	0.00089	0.0075	0.0119	0.0112	0.0093	0.022	0.0104	<0.0004
RW-145	C	BICA	Arsenic	1	mg/L	0.0213	0.0092	0.0034	<0.00047	0.0131	0.0031	<0.0003	<0.0004	0.0047
RW-145	C	BICA	TDS	na	mg/L	4,540	14,200	14,600	5,050	15,500	16,200	13,800	14,300	13,200
RW-145	C	BICA	D. O.	na	mg/L	2.7	1.3	3.7	4.6	4.3	4.9	0.3	0.4	1.8
RW-145	C	BICA	ORP	na	mV	nm	nm	nm	96.6	91.3	159.5	(174.9)	102.2	(88.1)
RW-145	C	BICA	pH	na	stnd unit	6.59	6.13	6.40	8.01	7.76	6.71	6.62	6.75	6.77
RW-145	C	BICA	Specific Conductance	na	µmhos/cm	nm	nm	nm	nm	nm	nm	18,520	24,720	25,390
RW-145	C	BICA	Temperature	na	°C	nm	nm	nm	nm	nm	nm	19.50	25.50	19.80
RW-145	C	BICA	Turbidity	na	NTU	nm	nm	nm	nm	nm	nm	51.90	4.90	3.60
RW-146	C	BICA	Benzene	0.5	mg/L	0.0016	<0.00034	0.0033	0.0012	0.0277	0.0378	0.0465	0.0487	<0.0004
RW-146	C	BICA	1,2-DCA	0.5	mg/L	0.0151	0.0177	0.0112	0.0068	0.0134	0.0188	0.0155	0.0133	0.0346
RW-146	C	BICA	Arsenic	1	mg/L	0.0135	0.0109	<0.0026	<0.00047	<0.00047	<0.0003	<0.0003	<0.0004	0.0141
RW-146	C	BICA	TDS	na	mg/L	11,700	18,100	15,000	2,750	14,200	13,100	12,800	20,400	14,200
RW-146	C	BICA	D. O.	na	mg/L	0.7	0.6	4.5	4.9	1.0	1.6	1.3	0.9	2.0
RW-146	C	BICA	ORP	na	mV	nm	nm	nm	191.1	(9.1)	75.1	(39.6)	(81.6)	(109.1)
RW-146	C	BICA	pH	na	stnd unit	6.49	6.41	6.61	7.21	7.01	6.17	6.31	6.63	6.62
RW-146	C	BICA	Specific Conductance	na	µmhos/cm	nm	nm	nm	nm	nm	nm	18,440	28,000	30,010
RW-146	C	BICA	Temperature	na	°C	nm	nm	nm	nm	nm	nm	20.20	25.80	20.00
RW-146	C	BICA	Turbidity	na	NTU	nm	nm	nm	nm	nm	nm	4.10	3.00	3.80
RW-147	C	BICA	Benzene	0.5	mg/L	<0.00034	0.00069	<0.00047	0.0153	0.0273	0.0025	0.0015	0.0219	0.0028
RW-147	C	BICA	1,2-DCA	0.5	mg/L	0.00066	0.008	0.0098	0.0134	0.0205	0.0603	0.0122	0.0167	0.0146
RW-147	C	BICA	Arsenic	1	mg/L	0.0117	0.0177	0.0175	0.0057	<0.00047	<0.0003	0.00069	0.0185	0.0167
RW-147	C	BICA	TDS	na	mg/L	1,650	15,700	11,500	12,600	13,300	8,550	2,110	13,600	10,300
RW-147	C	BICA	D. O.	na	mg/L	1.7	2.3	3.4	5.1	0.6	4.2	0.8	1.2	1.4
RW-147	C	BICA	ORP	na	mV	nm	nm	nm	139.2	(39.3)	32.8	(13.9)	(8.8)	(28.4)
RW-147	C	BICA	pH	na	stnd unit	6.60	8.31	7.17	6.79	6.96	7.36	6.33	6.61	6.81
RW-147	C	BICA	Specific Conductance	na	µmhos/cm	nm	nm	nm	nm	nm	nm	2,770	25,120	24,860
RW-147	C	BICA	Temperature	na	°C	nm	nm	nm	nm	nm	nm	21.60	23.40	20.40
RW-147	C	BICA	Turbidity	na	NTU	nm	nm	nm	nm	nm	nm	2.80	3.00	2.60
IW-149	A	BICA	Benzene	0.5	mg/L	0.0021	0.0333	0.0261	0.0014	0.00072	0.00081	0.0049	0.0018	<0.0004
IW-149	A	BICA	TDS	na	mg/L	28,900	31,000	29,300	32,600	28,300	28,300	22,000	25,300	24,900
IW-149	A	BICA	D. O.	na	mg/L	1.2	0.5	0.7	0.6	0.6	0.7	1.2	1.4	1.4
IW-149	A	BICA	ORP	na	mV	nm	nm	nm	(184.6)	(164.2)	(116.0)	(57.3)	(55.1)	(41.8)

Table VI.B.3.b - GROUNDWATER MONITORING SYSTEM RESULTS - BICA and SITE E PROGRAMS

Alon USA LP - Big Spring Refinery

Well No.	Screen	Program	Constituent	$^{GW}GW_{Class3}$ (mg/L)	Units	CURRENT PERMIT ANALYSIS								
						Jul-19	Jan-20	Jul-20	Jan-21	Jul-21	Jan-22	Jul-22	Jan-23	Jul-23
RW-144	C	BICA	Benzene	0.5	mg/L	<0.0004	<0.0003	<0.00030	<0.00030	<0.0003	<0.00030	<0.00023	<0.00023	<0.00023
RW-144	C	BICA	1,2-DCA	0.5	mg/L	<0.0004	<0.00037	<0.00037	<0.00037	0.0147	0.0163	<0.00041	<0.00041	<0.00041
RW-144	C	BICA	Arsenic	1	mg/L	0.013	0.0081	0.0587	0.0587	0.0069	0.0084	0.0151	0.0152	0.0135
RW-144	C	BICA	TDS	na	mg/L	7,100	7,210	1,750	1,750	8,940	9,580	8,200	9,970	15,300
RW-144	C	BICA	D. O.	na	mg/L	2.7	1.7	2.8	2.8	3.1	3.7	4.2	4.8	1.8
RW-144	C	BICA	ORP	na	mV	24.6	98.1	66.4	66.4	96.8	49.3	59.2	89.6	58.2
RW-144	C	BICA	pH	na	stnd unit	6.97	6.81	7.28	7.28	7.23	7.18	7.14	6.84	6.75
RW-144	C	BICA	Specific Conductance	na	µmhos/cm	8,870	10,590	1,746	1,746	15,040	16,780	14,230	13,310	10,930
RW-144	C	BICA	Temperature	na	°C	23.3	19.9	23.5	23.5	17.7	19.6	21.8	18.2	22.4
RW-144	C	BICA	Turbidity	na	NTU	4.50	1.50	3.50	3.50	2.20	2.60	2.10	1.70	0.60
RW-145	C	BICA	Benzene	0.5	mg/L	<0.0004	<0.0003	<0.0003	<0.0003	<0.00030	0.0012	<0.0011	<0.00023	<0.00023
RW-145	C	BICA	1,2-DCA	0.5	mg/L	<0.0004	<0.00037	<0.00037	<0.00037	<0.00037	<0.00037	0.006	<0.00041	<0.00041
RW-145	C	BICA	Arsenic	1	mg/L	0.0065	0.0072	0.0958	0.0958	0.0097	0.0133	0.0084	0.011	0.0144
RW-145	C	BICA	TDS	na	mg/L	15,200	11,600	12,300	12,300	9,160	10,200	11,800	10,300	8,100
RW-145	C	BICA	D. O.	na	mg/L	1.5	1.2	1.8	1.8	2.7	1.9	1.5	1.4	1.3
RW-145	C	BICA	ORP	na	mV	(251.2)	109.9	106.1	106.1	98.3	106.1	(164.0)	9.2	(32.9)
RW-145	C	BICA	pH	na	stnd unit	7.24	6.75	6.84	6.84	6.78	6.17	6.20	6.64	7.01
RW-145	C	BICA	Specific Conductance	na	µmhos/cm	21,000	17,010	14,910	14,910	13,470	11,890	13,710	12,870	9,530
RW-145	C	BICA	Temperature	na	°C	24.1	20.2	23.1	23.1	21.0	23.2	25.6	19.9	23.0
RW-145	C	BICA	Turbidity	na	NTU	22.70	1.70	1.00	1.00	1.30	1.20	3.50	1.20	1.30
RW-146	C	BICA	Benzene	0.5	mg/L	<0.0004	<0.0003	<0.0003	<0.0003	<0.00030	<0.00030	<0.00023	<0.00023	<0.00023
RW-146	C	BICA	1,2-DCA	0.5	mg/L	0.0386	0.0306	0.0276	0.0276	0.0215	0.0343	<0.00041	0.005	0.0176
RW-146	C	BICA	Arsenic	1	mg/L	0.0167	0.0102	<0.012	<0.012	0.0094	0.0122	0.0134	0.0156	0.0115
RW-146	C	BICA	TDS	na	mg/L	15,200	15,300	13,300	13,300	11,600	12,900	2,940	6,820	16,500
RW-146	C	BICA	D. O.	na	mg/L	1.5	1.1	1.8	1.8	1.7	2.1	1.8	2.5	2.4
RW-146	C	BICA	ORP	na	mV	(234.2)	(43.9)	(65.9)	(65.9)	(346.1)	(89.8)	(191.2)	(104.7)	(268.8)
RW-146	C	BICA	pH	na	stnd unit	6.79	6.32	6.69	6.69	6.92	6.81	6.68	6.61	7.16
RW-146	C	BICA	Specific Conductance	na	µmhos/cm	20,700	24,700	20,040	20,040	13,500	19,660	5,040	4,670	12,640
RW-146	C	BICA	Temperature	na	°C	23.7	19.9	24.1	24.1	21.3	23.8	23.5	16.8	23.4
RW-146	C	BICA	Turbidity	na	NTU	2.70	1.20	2.10	2.10	0.50	1.20	303.00	2.50	5.80
RW-147	C	BICA	Benzene	0.5	mg/L	<0.0004	<0.0003	0.00049	0.00049	<0.0003	0.00054	<0.0045	<0.00023	0.00038
RW-147	C	BICA	1,2-DCA	0.5	mg/L	0.0146	0.0101	<0.00037	<0.00037	0.0015	<0.00037	0.0488	<0.00041	0.0317
RW-147	C	BICA	Arsenic	1	mg/L	0.0312	0.41	<0.012	<0.012	0.0103	0.0539	0.0311	0.0053	0.0262
RW-147	C	BICA	TDS	na	mg/L	11,000	7,960	1,150	1,150	1,950	1,170	6,600	560	5,500
RW-147	C	BICA	D. O.	na	mg/L	1.9	1.7	2.0	2.0	1.9	2.0	1.5	2.7	1.9
RW-147	C	BICA	ORP	na	mV	(109.4)	(80.7)	57.2	57.2	128.7	(198.9)	(167.2)	(192.0)	(168.1)
RW-147	C	BICA	pH	na	stnd unit	7.14	7.19	7.00	7.00	6.87	6.75	6.05	6.84	7.12
RW-147	C	BICA	Specific Conductance	na	µmhos/cm	15,180	12,370	1,663	1,663	2,573	1,987	14,080	13,020	6,000
RW-147	C	BICA	Temperature	na	°C	24.9	21.1	23.8	23.8	20.8	23.5	23.5	19.1	23.4
RW-147	C	BICA	Turbidity	na	NTU	1.90	3.80	1.20	1.20	0.90	6.40	1.40	0.90	2.40
IW-149	A	BICA	Benzene	0.5	mg/L	0.0041	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.00023	<0.0011	<0.0011
IW-149	A	BICA	TDS	na	mg/L	23,100	22,000	16,500	16,500	15,900	14,900	13,200	12,200	2,800
IW-149	A	BICA	D. O.	na	mg/L	1.2	1.2	1.3	1.3	1.3	0.6	0.7	0.6	1.6
IW-149	A	BICA	ORP	na	mV	(152.1)	(196.8)	(175.1)	(175.1)	(81.8)	(95.6)	(80.1)	(67.5)	(39.6)

Table VI.B.3.b - GROUNDWATER MONITORING SYSTEM RESULTS - BICA and SITE E PROGRAMS

Alon USA LP - Big Spring Refinery

Well No.	Screen	Program	Constituent	$^{GW}GW_{Class3}$ (mg/L)	Units	PRE-PERMIT ANALYSIS								
						Jul-10	Jan-11	Jul-11	Jan-12	Jul-12	Jan-13	Jul-13	Jan-14	Jul-14
IW-149	A	BICA	pH	na	stnd unit	6.56	6.27	6.62	nm	7.09	7.01	7.35	6.47	6.33
IW-149	A	BICA	Specific Conductance	na	µmhos/cm	40,000	50,400	43,800	nm	46,300	47,100	44,300	40,800	34,300
IW-149	A	BICA	Temperature	na	°C	23.00	18.89	27.47	nm	22.67	20.57	22.03	19.81	23.80
IW-149	A	BICA	Turbidity	na	NTU	2.60	1.50	0.00	nm	0.00	0.00	72.50	67.10	34.30
IW-149A	B	BICA	Benzene	0.5	mg/L	1.7000	1.3000	1.3300	ns	1.7200	2.3100	2.2400	1.8000	1.6400
IW-149A	B	BICA	TDS	na	mg/L	34,500	35,000	37,500	ns	35,300	34,200	32,500	31,400	32,300
IW-149A	B	BICA	D. O.	na	mg/L	nm	nm	nm	nm	nm	nm	nm	nm	nm
IW-149A	B	BICA	ORP	na	mV	nm	nm	nm	nm	nm	nm	nm	nm	nm
IW-149A	B	BICA	pH	na	stnd unit	6.31	6.49	6.36	nm	7.07	5.29	7.29	6.41	6.44
IW-149A	B	BICA	Specific Conductance	na	µmhos/cm	48,500	40,000	45,300	nm	48,800	48,000	47,000	48,800	32,900
IW-149A	B	BICA	Temperature	na	°C	23.60	18.55	27.63	nm	22.71	21.31	21.81	17.07	22.67
IW-149A	B	BICA	Turbidity	na	NTU	3.60	0.00	0.00	nm	0.00	0.00	0.00	75.40	0.00
IW-150	A	BICA	Benzene	0.5	mg/L	<0.001	<0.001	<0.00025	0.00063	0.00036	<0.00034	<0.00034	<0.00034	<0.00034
IW-150	A	BICA	TDS	na	mg/L	15,900	15,400	14,600	13,800	15,200	15,100	14,100	15,000	14,700
IW-150	A	BICA	D. O.	na	mg/L	nm	nm	nm	nm	nm	nm	nm	nm	nm
IW-150	A	BICA	ORP	na	mV	nm	nm	nm	nm	nm	nm	nm	nm	nm
IW-150	A	BICA	pH	na	stnd unit	6.38	6.36	5.98	7.07	7.81	5.46	7.61	6.91	6.00
IW-150	A	BICA	Specific Conductance	na	µmhos/cm	20,900	21,400	19,500	25	21,400	23,200	22,400	22	18,300
IW-150	A	BICA	Temperature	na	°C	25.82	20.38	24.91	19.72	21.86	20.51	21.21	19.01	23.19
IW-150	A	BICA	Turbidity	na	NTU	72.60	0.00	0.00	0.00	31.50	13.10	25.40	41.40	0.10
IW-150A	B	BICA	Benzene	0.5	mg/L	<0.001	<0.001	<0.00025	0.0006	0.0003	<0.00034	<0.00034	<0.00034	<0.00034
IW-150A	B	BICA	TDS	na	mg/L	19,400	17,700	17,200	16,700	18,500	17,400	17,100	17,200	16,900
IW-150A	B	BICA	D. O.	na	mg/L	nm	nm	nm	nm	nm	nm	nm	nm	nm
IW-150A	B	BICA	ORP	na	mV	nm	nm	nm	nm	nm	nm	nm	nm	nm
IW-150A	B	BICA	pH	na	stnd unit	6.75	6.51	6.74	6.93	7.49	7.22	7.50	6.93	5.84
IW-150A	B	BICA	Specific Conductance	na	µmhos/cm	9,000	25,200	23,100	29	27,500	26,700	25,900	25,900	19,900
IW-150A	B	BICA	Temperature	na	°C	23.99	19.10	25.10	19.89	21.63	19.83	21.62	18.76	24.55
IW-150A	B	BICA	Turbidity	na	NTU	104	0	0	0	56.4	0	0	5.2	0
MW-152	A	BICA	Benzene	0.5	mg/L	180.0000	140.0000	96.0000	37.8000	29.5000	PSH	65.5000	151.0000	245.0000
MW-152	A	BICA	TDS	na	mg/L	1400	1260	1520	1420	1400	Thickness	1170	1180	1270
MW-152	A	BICA	D. O.	na	mg/L	nm	nm	nm	nm	nm	In Feet	nm	nm	nm
MW-152	A	BICA	ORP	na	mV	nm	nm	nm	nm	nm	3.69	nm	nm	nm
MW-152	A	BICA	pH	na	stnd unit	6.69	7.17	6.76	6.70	7.35	nm	5.59	7.81	6.93
MW-152	A	BICA	Specific Conductance	na	µmhos/cm	2,470	2,150	2,180	2	2,020	nm	1,590	1,680	1,320
MW-152	A	BICA	Temperature	na	°C	24.98	21.47	26.40	22.66	25.16	nm	22.84	21.98	26.39
MW-152	A	BICA	Turbidity	na	NTU	39.60	11.80	0.00	0.00	0.00	nm	0.00	0.00	0.00
MW-152A	B	BICA	Benzene	0.5	mg/L	0.0092	<0.001	0.0706	0.0855	0.0435	0.0272	0.0513	0.0615	0.0803
MW-152A	B	BICA	TDS	na	mg/L	3,300	2,920	2,660	2,750	2,890	2,750	2,920	3,030	2,780
MW-152A	B	BICA	D. O.	na	mg/L	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-152A	B	BICA	ORP	na	mV	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-152A	B	BICA	pH	na	stnd unit	6.86	7.40	6.78	6.84	7.48	6.70	5.60	7.94	6.74
MW-152A	B	BICA	Specific Conductance	na	µmhos/cm	3,000	5	4,230	4	4,490	4,330	4,290	4,180	4,240
MW-152A	B	BICA	Temperature	na	°C	24.94	27.10	25.79	22.39	24.53	22.26	22.03	22.14	25.27

Table VI.B.3.b - GROUNDWATER MONITORING SYSTEM RESULTS - BICA and SITE E PROGRAMS

Alon USA LP - Big Spring Refinery

Well No.	Screen	Program	Constituent	$^{GW}GW_{Class3}$ (mg/L)	Units	CURRENT PERMIT ANALYSIS								
						Mar-15	Jul-15	Jan-16	Jul-16	Jan-17	Jul-17	Jan-18	Jul-18	Jan-19
IW-149	A	BICA	pH	na	stnd unit	6.76	6.52	6.34	6.61	7.02	6.40	6.58	6.68	6.61
IW-149	A	BICA	Specific Conductance	na	µmhos/cm	nm	nm	nm	nm	nm	nm	10,600	34,900	33,300
IW-149	A	BICA	Temperature	na	°C	nm	nm	nm	nm	nm	nm	21.40	22.70	20.70
IW-149	A	BICA	Turbidity	na	NTU	nm	nm	nm	nm	nm	nm	5.40	7.00	6.00
IW-149A	B	BICA	Benzene	0.5	mg/L	<0.00034	1.4000	2.0200	1.8900	1.7800	1.7500	0.7140	0.4510	0.1120
IW-149A	B	BICA	TDS	na	mg/L	29,900	29,300	30,000	31,400	27,700	28,600	23,200	30,700	23,400
IW-149A	B	BICA	D. O.	na	mg/L	1.3	0.5	0.8	0.5	0.6	0.5	0.6	1.7	1.6
IW-149A	B	BICA	ORP	na	mV	nm	nm	nm	(170.5)	(122.2)	(57.4)	(68.7)	(182.8)	(153.9)
IW-149A	B	BICA	pH	na	stnd unit	6.71	6.43	6.29	6.47	6.94	6.35	6.48	6.50	6.55
IW-149A	B	BICA	Specific Conductance	na	µmhos/cm	nm	nm	nm	nm	nm	nm	32,200	29,200	30,800
IW-149A	B	BICA	Temperature	na	°C	nm	nm	nm	nm	nm	nm	22.00	20.60	19.90
IW-149A	B	BICA	Turbidity	na	NTU	nm	nm	nm	nm	nm	nm	7.10	2.60	2.50
IW-150	A	BICA	Benzene	0.5	mg/L	<0.00034	<0.00034	<0.00047	<0.00047	<0.00047	<0.0003	<0.0003	<0.0004	<0.0004
IW-150	A	BICA	TDS	na	mg/L	13,800	13,000	12,100	13,500	12,300	12,700	11,300	12,700	11,500
IW-150	A	BICA	D. O.	na	mg/L	1.4	1.8	1.5	0.7	0.8	1.1	0.9	1.9	0.9
IW-150	A	BICA	ORP	na	mV	nm	nm	nm	118.5	121.3	99.3	97.0	68.4	61.0
IW-150	A	BICA	pH	na	stnd unit	704.00	6.75	6.74	6.92	6.83	7.04	6.84	6.84	6.72
IW-150	A	BICA	Specific Conductance	na	µmhos/cm	nm	nm	nm	nm	nm	nm	15,120	14,140	14,390
IW-150	A	BICA	Temperature	na	°C	nm	nm	nm	nm	nm	nm	18.70	20.20	17.50
IW-150	A	BICA	Turbidity	na	NTU	nm	nm	nm	nm	nm	nm	1.90	2.70	4.10
IW-150A	B	BICA	Benzene	0.5	mg/L	0.0536	<0.00034	<0.00047	<0.00047	<0.00047	<0.0003	<0.0003	<0.0004	<0.0004
IW-150A	B	BICA	TDS	na	mg/L	15,500	15,500	14,000	14,900	12,000	13,300	13,300	13,000	10,700
IW-150A	B	BICA	D. O.	na	mg/L	2.6	1.3	1.1	0.6	0.8	0.7	0.9	2.0	1.0
IW-150A	B	BICA	ORP	na	mV	nm	nm	nm	124.7	108.8	107.7	101.7	72.6	57.1
IW-150A	B	BICA	pH	na	stnd unit	7.01	6.63	6.61	6.83	6.80	6.99	6.84	6.80	6.70
IW-150A	B	BICA	Specific Conductance	na	µmhos/cm	nm	nm	nm	nm	nm	nm	15,610	14,250	14,060
IW-150A	B	BICA	Temperature	na	°C	nm	nm	nm	nm	nm	nm	19.30	21.10	17.40
IW-150A	B	BICA	Turbidity	na	NTU	nm	nm	nm	nm	nm	nm	2.2	1.5	1
MW-152	A	BICA	Benzene	0.5	mg/L	335.0000	PSH	PSH	PSH	PSH	PSH	PSH	PSH	PSH
MW-152	A	BICA	TDS	na	mg/L	620	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness
MW-152	A	BICA	D. O.	na	mg/L	1.5	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet
MW-152	A	BICA	ORP	na	mV	nm	4.38	4.09	3.40	3.13	3.13	3.14	3.72	3.24
MW-152	A	BICA	pH	na	stnd unit	6.71	nm	nm	nm	nm	nm	nm	nm	nm
MW-152	A	BICA	Specific Conductance	na	µmhos/cm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-152	A	BICA	Temperature	na	°C	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-152	A	BICA	Turbidity	na	NTU	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-152A	B	BICA	Benzene	0.5	mg/L	0.0091	0.0763	0.0014	<0.00047	<0.00047	<0.0003	<0.0003	0.0772	0.5750
MW-152A	B	BICA	TDS	na	mg/L	2,720	2,680	2,630	2,600	2,560	2,580	2,130	1,980	1,790
MW-152A	B	BICA	D. O.	na	mg/L	1.1	1.1	1.1	2.1	1.1	2.1	1.8	1.4	1.5
MW-152A	B	BICA	ORP	na	mV	nm	nm	nm	(79.4)	(124.6)	(113.5)	(159.9)	(165.4)	(84.1)
MW-152A	B	BICA	pH	na	stnd unit	6.83	6.77	6.86	6.89	6.72	6.81	6.62	6.60	6.74
MW-152A	B	BICA	Specific Conductance	na	µmhos/cm	nm	nm	nm	nm	nm	nm	3,510	3,030	1,960
MW-152A	B	BICA	Temperature	na	°C	nm	nm	nm	nm	nm	nm	22.00	27.00	18.20

Table VI.B.3.b - GROUNDWATER MONITORING SYSTEM RESULTS - BICA and SITE E PROGRAMS

Alon USA LP - Big Spring Refinery

Well No.	Screen	Program	Constituent	$^{GW}GW_{Class3}$ (mg/L)	Units	CURRENT PERMIT ANALYSIS								
						Jul-19	Jan-20	Jul-20	Jan-21	Jul-21	Jan-22	Jul-22	Jan-23	Jul-23
IW-149	A	BICA	pH	na	stnd unit	6.82	6.67	6.74	6.74	6.58	6.64	6.62	6.85	6.47
IW-149	A	BICA	Specific Conductance	na	µmhos/cm	28,200	27,600	28,100	28,100	34,100	30,000	16,220	13,720	19,390
IW-149	A	BICA	Temperature	na	°C	22.4	20.8	19.6	19.6	17.5	23.6	23.1	19.5	22.8
IW-149	A	BICA	Turbidity	na	NTU	5.90	6.90	5.60	5.60	3.50	2.70	13.20	6.20	5.80
IW-149A	B	BICA	Benzene	0.5	mg/L	0.0782	0.0460	0.1910	0.1910	0.0013	0.0043	0.00063	<0.0011	<0.0011
IW-149A	B	BICA	TDS	na	mg/L	24,400	22,000	18,900	18,900	18,700	15,100	13,500	9,790	5,400
IW-149A	B	BICA	D. O.	na	mg/L	1.2	1.3	1.2	1.2	1.3	0.9	0.6	0.6	1.4
IW-149A	B	BICA	ORP	na	mV	(190.4)	(228.9)	(189.1)	(189.1)	(125.1)	(116.2)	(87.5)	(65.4)	21.3
IW-149A	B	BICA	pH	na	stnd unit	6.67	6.47	6.58	6.58	6.55	6.60	6.60	6.84	6.44
IW-149A	B	BICA	Specific Conductance	na	µmhos/cm	28,900	27,500	29,000	29,000	34,400	31,000	17,040	14,190	20,200
IW-149A	B	BICA	Temperature	na	°C	21.7	19.7	20.2	20.2	18.4	23.9	23.1	17.7	25.5
IW-149A	B	BICA	Turbidity	na	NTU	3.60	4.50	3.60	3.60	1.90	2.50	9.60	4.40	5.70
IW-150	A	BICA	Benzene	0.5	mg/L	<0.0004	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.00023	<0.0023	<0.0023
IW-150	A	BICA	TDS	na	mg/L	13,000	12,800	13,300	13,300	10,300	11,000	11,200	11,200	4,000
IW-150	A	BICA	D. O.	na	mg/L	1.7	1.0	1.2	1.2	1.2	1.1	0.8	1.1	0.9
IW-150	A	BICA	ORP	na	mV	75.8	98.0	122.8	122.8	91.7	119.7	106.7	43.4	99.1
IW-150	A	BICA	pH	na	stnd unit	6.79	6.81	6.97	6.97	6.77	6.90	6.88	6.76	6.80
IW-150	A	BICA	Specific Conductance	na	µmhos/cm	13,900	16,140	24,700	24,700	21,800	21,600	13,090	17,840	20,400
IW-150	A	BICA	Temperature	na	°C	25.2	21.5	22.6	22.6	21.0	21.9	22.8	20.4	23.4
IW-150	A	BICA	Turbidity	na	NTU	1.70	1.70	1.80	1.80	7.60	2.80	10.60	8.90	2.10
IW-150A	B	BICA	Benzene	0.5	mg/L	<0.0004	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.00023	<0.0045	<0.0045
IW-150A	B	BICA	TDS	na	mg/L	12,700	12,900	12,300	12,300	11,800	11,200	11,500	9,040	3,600
IW-150A	B	BICA	D. O.	na	mg/L	1.2	1.0	1.1	1.1	1.2	1.1	1.0	1.3	1.0
IW-150A	B	BICA	ORP	na	mV	92.4	89.4	114.1	114.1	106.0	120.5	125.0	69.1	102.7
IW-150A	B	BICA	pH	na	stnd unit	6.73	6.76	6.88	6.88	6.71	6.82	6.73	6.64	6.69
IW-150A	B	BICA	Specific Conductance	na	µmhos/cm	13,930	16,310	25,300	25,300	23,000	22,200	14,310	18,570	20,200
IW-150A	B	BICA	Temperature	na	°C	25.7	22.0	24.1	24.1	20.8	22.3	26.3	18.9	24.2
IW-150A	B	BICA	Turbidity	na	NTU	1.40	0.90	1.40	1.40	2.30	1.30	10.10	9.00	8.40
MW-152	A	BICA	Benzene	0.5	mg/L	PSH	PSH	PSH	PSH	PSH	PSH	PSH	PSH	PSH
MW-152	A	BICA	TDS	na	mg/L	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness
MW-152	A	BICA	D. O.	na	mg/L	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet
MW-152	A	BICA	ORP	na	mV	2.81	3.44	3.25	3.25	0.88	1.44	1.20	1.57	1.06
MW-152	A	BICA	pH	na	stnd unit	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-152	A	BICA	Specific Conductance	na	µmhos/cm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-152	A	BICA	Temperature	na	°C	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-152	A	BICA	Turbidity	na	NTU	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-152A	B	BICA	Benzene	0.5	mg/L	<0.0004	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.00023	<0.00023	<0.00023
MW-152A	B	BICA	TDS	na	mg/L	1,720	1,820	1,650	1,650	3,010	3,150	2,430	2,400	2,760
MW-152A	B	BICA	D. O.	na	mg/L	1.2	1.1	1.1	1.1	1.5	1.2	0.8	1.2	1.6
MW-152A	B	BICA	ORP	na	mV	(88.9)	(78.2)	(128.3)	(128.3)	(75.3)	(107.8)	(83.3)	(65.2)	(95.1)
MW-152A	B	BICA	pH	na	stnd unit	6.87	6.82	6.94	6.94	6.77	6.70	6.76	6.73	6.51
MW-152A	B	BICA	Specific Conductance	na	µmhos/cm	2,140	2,450	2,210	2,210	2,830	4,790	3,690	3,640	4,990
MW-152A	B	BICA	Temperature	na	°C	25.2	21.0	23.4	23.4	21.2	24.5	25.4	18.3	26.2

Table VI.B.3.b - GROUNDWATER MONITORING SYSTEM RESULTS - BICA and SITE E PROGRAMS

Alon USA LP - Big Spring Refinery

Well No.	Screen	Program	Constituent	$^{GW}GW_{Class3}$ (mg/L)	Units	PRE-PERMIT ANALYSIS								
						Jul-10	Jan-11	Jul-11	Jan-12	Jul-12	Jan-13	Jul-13	Jan-14	Jul-14
MW-152A	B	BICA	Turbidity	na	NTU	1.30	18.50	0.00	0.00	0.00	0.00	0.00	0.00	10.90
MW-153	A	BICA	Benzene	0.5	mg/L	0.0290	0.0240	0.0076	0.0244	0.0182	0.0162	0.0175	0.0185	0.0803
MW-153	A	BICA	TDS	na	mg/L	5,320	2,470	4,100	4,360	4,400	4,800	79,000	4,780	2,780
MW-153	A	BICA	D. O.	na	mg/L	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-153	A	BICA	ORP	na	mV	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-153	A	BICA	pH	na	stnd unit	6.93	6.91	6.40	6.59	7.55	6.62	6.36	6.20	6.72
MW-153	A	BICA	Specific Conductance	na	µmhos/cm	7,990	8,181	6,840	7	6,910	7,020	6,560	7,360	6,160
MW-153	A	BICA	Temperature	na	°C	24.19	13.44	23.35	20.71	21.15	19.17	21.01	19.17	21.11
MW-153	A	BICA	Turbidity	na	NTU	6.67	4.20	0.00	12.70	168.00	95.20	74.10	162.00	0.00
MW-153A	B	BICA	Benzene	0.5	mg/L	0.0300	0.0230	<0.00025	0.0860	0.0186	0.0145	0.0147	0.0192	0.0191
MW-153A	B	BICA	TDS	na	mg/L	5,260	4,960	4,250	4,410	4,250	4,650	4,490	4,610	4,690
MW-153A	B	BICA	D. O.	na	mg/L	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-153A	B	BICA	ORP	na	mV	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-153A	B	BICA	pH	na	stnd unit	6.83	7.16	6.63	6.83	7.52	6.72	6.44	6.13	6.79
MW-153A	B	BICA	Specific Conductance	na	µmhos/cm	7,850	6,010	6,990	7	6,870	6,940	6,470	7,250	6,160
MW-153A	B	BICA	Temperature	na	°C	22.78	20.50	22.00	20.43	20.85	19.69	21.10	18.90	21.03
MW-153A	B	BICA	Turbidity	na	NTU	70.90	13.70	0.00	42.20	48.10	48.40	0.00	255.00	0.00
MW-154	A	BICA	Benzene	0.5	mg/L	<0.001	<0.001	ns	<0.00025	<0.00034	<0.00034	0.0089	0.0004	<0.00034
MW-154	A	BICA	TDS	na	mg/L	2,820	2,630	ns	1,850	1,910	1,920	2,160	2,290	2,410
MW-154	A	BICA	D. O.	na	mg/L	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-154	A	BICA	ORP	na	mV	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-154	A	BICA	pH	na	stnd unit	7.31	6.90	nm	7.24	7.89	6.85	6.68	6.58	6.94
MW-154	A	BICA	Specific Conductance	na	µmhos/cm	3,596	900	nm	3	2,770	2,980	3,000	3,660	3,450
MW-154	A	BICA	Temperature	na	°C	21.64	21.72	nm	20.11	23.25	19.78	21.66	20.53	22.96
MW-154	A	BICA	Turbidity	na	NTU	2.02	0.48	nm	0.10	0.00	0.00	0.00	34.40	0.00
MW-154A	B	BICA	Benzene	0.5	mg/L	0.0064	0.0037	0.0059	0.0056	0.0048	0.0053	0.0100	0.0089	0.0255
MW-154A	B	BICA	TDS	na	mg/L	4,120	3,770	3,110	3,740	4,620	5,480	6,420	7,830	13,900
MW-154A	B	BICA	D. O.	na	mg/L	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-154A	B	BICA	ORP	na	mV	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-154A	B	BICA	pH	na	stnd unit	7.98	6.69	6.93	7.04	7.39	6.46	6.27	6.11	6.46
MW-154A	B	BICA	Specific Conductance	na	µmhos/cm	5,425	5,510	5,280	6	6,990	8,140	9,210	12,500	16,500
MW-154A	B	BICA	Temperature	na	°C	21.64	11.35	28.84	20.15	23.06	19.74	20.74	20.73	24.51
MW-154A	B	BICA	Turbidity	na	NTU	3.71	4.69	0.00	0.00	0.00	0.00	0.00	0.80	0.00
MW-155	A	BICA	Benzene	0.5	mg/L	<0.001	<0.001	<0.00025	<0.00025	<0.00025	<0.0020	0.0066	<0.00034	0.0023
MW-155	A	BICA	TDS	na	mg/L	2,170	1,210	1,040	1,080	1,100	1,180	1,220	1,270	1,270
MW-155	A	BICA	D. O.	na	mg/L	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-155	A	BICA	ORP	na	mV	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-155	A	BICA	pH	na	stnd unit	7.99	6.82	6.76	7.20	7.74	8.23	6.85	7.96	6.71
MW-155	A	BICA	Specific Conductance	na	µmhos/cm	1,766	1,680	1,470	2	1,600	1,610	1,600	1,540	1,470
MW-155	A	BICA	Temperature	na	°C	22.90	16.47	24.19	20.02	24.11	20.35	23.64	19.22	22.74
MW-155	A	BICA	Turbidity	na	NTU	2.13	4.61	0.00	0.00	0.00	0.00	0.00	0.40	2.50
MW-155A	B	BICA	Benzene	0.5	mg/L	0.1400	0.4400	0.5710	0.5800	0.3950	0.3700	0.5560	0.3880	0.1860
MW-155A	B	BICA	TDS	na	mg/L	24,100	22,800	24,100	21,500	20,900	20,200	19,900	18,000	17,800

Table VI.B.3.b - GROUNDWATER MONITORING SYSTEM RESULTS - BICA and SITE E PROGRAMS

Alon USA LP - Big Spring Refinery

Well No.	Screen	Program	Constituent	$^{GW}GW_{Class3}$ (mg/L)	Units	CURRENT PERMIT ANALYSIS								
						Mar-15	Jul-15	Jan-16	Jul-16	Jan-17	Jul-17	Jan-18	Jul-18	Jan-19
MW-152A	B	BICA	Turbidity	na	NTU	nm	nm	nm	nm	nm	nm	3.10	6.90	6.10
MW-153	A	BICA	Benzene	0.5	mg/L	0.0186	0.0177	0.0173	0.0136	0.0112	0.0120	0.0100	0.0113	0.0098
MW-153	A	BICA	TDS	na	mg/L	5,200	5,260	5,120	5,360	5,380	5,000	4,760	5,590	4,840
MW-153	A	BICA	D. O.	na	mg/L	7.9	0.5	1.2	1.6	1.2	1.1	0.9	1.1	1.5
MW-153	A	BICA	ORP	na	mV	nm	nm	nm	110.7	24.9	62.3	(17.6)	(49.3)	90.2
MW-153	A	BICA	pH	na	stnd unit	6.92	6.67	6.81	6.82	6.67	6.67	6.61	6.45	6.64
MW-153	A	BICA	Specific Conductance	na	µmhos/cm	nm	nm	nm	nm	nm	nm	7,140	7,160	7,420
MW-153	A	BICA	Temperature	na	°C	nm	nm	nm	nm	nm	nm	20.30	22.50	19.20
MW-153	A	BICA	Turbidity	na	NTU	nm	nm	nm	nm	nm	nm	5.30	1.70	5.60
MW-153A	B	BICA	Benzene	0.5	mg/L	0.0179	0.0152	0.0162	0.0135	0.0108	0.0122	0.0095	0.0121	0.0108
MW-153A	B	BICA	TDS	na	mg/L	5,270	5,320	5,030	5,330	5,120	5,650	4,880	5,480	4,940
MW-153A	B	BICA	D. O.	na	mg/L	1.7	1.3	1.2	1.6	1.4	1.4	1.2	1.3	1.0
MW-153A	B	BICA	ORP	na	mV	nm	nm	nm	119.5	60.8	(29.2)	(11.9)	(72.5)	47.2
MW-153A	B	BICA	pH	na	stnd unit	6.74	6.71	6.79	6.83	6.61	6.67	6.55	6.47	6.73
MW-153A	B	BICA	Specific Conductance	na	µmhos/cm	nm	nm	nm	nm	nm	nm	7,240	7,090	7,690
MW-153A	B	BICA	Temperature	na	°C	nm	nm	nm	nm	nm	nm	20.90	22.60	19.20
MW-153A	B	BICA	Turbidity	na	NTU	nm	nm	nm	nm	nm	nm	5.90	6.80	1.20
MW-154	A	BICA	Benzene	0.5	mg/L	<0.00034	<0.00034	<0.00047	<0.00047	<0.00047	<0.0003	<0.0003	<0.0004	<0.0004
MW-154	A	BICA	TDS	na	mg/L	2,410	1,130	1,190	1,150	1,010	1,130	1,130	933	955
MW-154	A	BICA	D. O.	na	mg/L	3.1	3.1	2.8	2.6	3.5	3.0	3.2	3.7	3.5
MW-154	A	BICA	ORP	na	mV	nm	nm	nm	86.3	58.5	120.4	44.8	(33.5)	(16.9)
MW-154	A	BICA	pH	na	stnd unit	7.10	7.11	7.55	7.61	7.34	7.03	7.70	7.85	8.05
MW-154	A	BICA	Specific Conductance	na	µmhos/cm	nm	nm	nm	nm	nm	nm	1,528	1,074	945
MW-154	A	BICA	Temperature	na	°C	nm	nm	nm	nm	nm	nm	22.00	22.20	20.80
MW-154	A	BICA	Turbidity	na	NTU	nm	nm	nm	nm	nm	nm	4.80	5.20	5.10
MW-154A	B	BICA	Benzene	0.5	mg/L	0.0255	0.0056	0.0239	0.0204	0.0169	0.0404	0.0109	0.0129	0.0030
MW-154A	B	BICA	TDS	na	mg/L	13,700	7,120	10,900	8,900	9,180	13,300	9,130	15,200	13,000
MW-154A	B	BICA	D. O.	na	mg/L	1.1	1.1	0.7	0.6	0.8	0.6	0.5	1.0	1.9
MW-154A	B	BICA	ORP	na	mV	nm	nm	nm	72.8	101.3	125.0	83.1	(3.7)	17.5
MW-154A	B	BICA	pH	na	stnd unit	6.07	6.55	6.65	6.71	6.65	6.30	6.90	6.91	7.26
MW-154A	B	BICA	Specific Conductance	na	µmhos/cm	nm	nm	nm	nm	nm	nm	11,610	13,910	14,320
MW-154A	B	BICA	Temperature	na	°C	nm	nm	nm	nm	nm	nm	22.20	22.40	20.20
MW-154A	B	BICA	Turbidity	na	NTU	nm	nm	nm	nm	nm	nm	7.80	8.50	9.80
MW-155	A	BICA	Benzene	0.5	mg/L	<0.00034	<0.00034	<0.00047	<0.00047	<0.00047	<0.0003	<0.0003	<0.0004	<0.0004
MW-155	A	BICA	TDS	na	mg/L	1,100	812	658	501	515	434	396	466	374
MW-155	A	BICA	D. O.	na	mg/L	2.4	5.8	6.6	6.1	6.9	5.4	4.9	4.8	4.7
MW-155	A	BICA	ORP	na	mV	nm	nm	nm	31.4	83.3	38.2	(58.6)	(66.3)	(68.5)
MW-155	A	BICA	pH	na	stnd unit	7.54	7.06	7.08	7.22	7.73	7.30	7.43	7.01	7.02
MW-155	A	BICA	Specific Conductance	na	µmhos/cm	nm	nm	nm	nm	nm	nm	567	568	578
MW-155	A	BICA	Temperature	na	°C	nm	nm	nm	nm	nm	nm	21.40	23.70	20.00
MW-155	A	BICA	Turbidity	na	NTU	nm	nm	nm	nm	nm	nm	4.30	3.50	4.30
MW-155A	B	BICA	Benzene	0.5	mg/L	0.4660	0.6120	0.4190	0.4390	0.4090	0.3580	0.2790	0.3210	0.3690
MW-155A	B	BICA	TDS	na	mg/L	15,000	16,100	19,700	27,800	29,300	35,000	29,200	173,000	30,000

Table VI.B.3.b - GROUNDWATER MONITORING SYSTEM RESULTS - BICA and SITE E PROGRAMS

Alon USA LP - Big Spring Refinery

Well No.	Screen	Program	Constituent	$^{GW}GW_{Class3}$ (mg/L)	Units	CURRENT PERMIT ANALYSIS								
						Jul-19	Jan-20	Jul-20	Jan-21	Jul-21	Jan-22	Jul-22	Jan-23	Jul-23
MW-152A	B	BICA	Turbidity	na	NTU	2.30	2.60	2.60	2.60	3.70	5.70	4.40	4.10	4.80
MW-153	A	BICA	Benzene	0.5	mg/L	0.0077	0.0081	0.0099	0.0099	0.0134	0.0158	0.00032	0.01070	0.00160
MW-153	A	BICA	TDS	na	mg/L	5,790	5,120	5,720	5,720	5,210	4,960	4,220	4,500	3,070
MW-153	A	BICA	D. O.	na	mg/L	1.5	1.7	1.1	1.1	1.4	1.5	1.4	2.5	2.2
MW-153	A	BICA	ORP	na	mV	46.8	70.2	12.9	12.9	21.9	14.7	31.9	66.1	68.3
MW-153	A	BICA	pH	na	stnd unit	6.68	6.64	6.67	6.67	6.83	6.80	6.70	6.87	6.90
MW-153	A	BICA	Specific Conductance	na	µmhos/cm	4,950	6,150	6,030	6,030	6,110	7,610	7,120	6,200	5,560
MW-153	A	BICA	Temperature	na	°C	23.1	16.8	22.6	22.6	19.6	21.9	24.6	17.0	22.1
MW-153	A	BICA	Turbidity	na	NTU	1.50	1.30	1.40	1.40	2.70	2.10	2.90	2.60	6.30
MW-153A	B	BICA	Benzene	0.5	mg/L	0.0113	0.0102	0.0122	0.0122	0.0060	0.0142	0.00820	0.01090	0.01020
MW-153A	B	BICA	TDS	na	mg/L	5,330	4,980	5,180	5,180	5,300	4,960	5,120	3,760	6,480
MW-153A	B	BICA	D. O.	na	mg/L	0.7	1.0	0.8	0.8	1.2	1.1	1.3	1.9	2.0
MW-153A	B	BICA	ORP	na	mV	36.1	50.9	61.7	61.7	34.5	55.7	40.5	(12.2)	(18.7)
MW-153A	B	BICA	pH	na	stnd unit	6.82	6.71	6.76	6.76	6.79	6.75	6.57	6.77	6.85
MW-153A	B	BICA	Specific Conductance	na	µmhos/cm	5,130	6,040	6,280	6,280	5,810	6,810	6,340	6,160	6,210
MW-153A	B	BICA	Temperature	na	°C	25.3	16.9	23.4	23.4	19.7	22.4	24.9	18.4	22.3
MW-153A	B	BICA	Turbidity	na	NTU	0.90	1.70	2.60	2.60	4.00	3.40	3.70	3.90	4.40
MW-154	A	BICA	Benzene	0.5	mg/L	<0.0004	<0.0003	0.00041	0.0004	<0.0003	<0.0003	<0.00023	<0.00023	<0.00023
MW-154	A	BICA	TDS	na	mg/L	864	588	934	934	872	853	1,090	1,100	2,220
MW-154	A	BICA	D. O.	na	mg/L	4.0	4.2	2.7	2.7	3.0	3.0	1.9	2.3	2.3
MW-154	A	BICA	ORP	na	mV	72.0	88.8	65.2	65.2	53.1	48.3	71.8	93.7	109.6
MW-154	A	BICA	pH	na	stnd unit	7.62	7.80	7.44	7.44	7.57	7.61	7.12	6.98	6.86
MW-154	A	BICA	Specific Conductance	na	µmhos/cm	934	1,050	932	932	991	1,678	1,670	2,150	4,740
MW-154	A	BICA	Temperature	na	°C	23.0	19.3	23.1	23.1	20.1	22.7	27.0	19.3	23.7
MW-154	A	BICA	Turbidity	na	NTU	3.60	5.10	5.30	5.30	4.80	4.10	7.10	5.10	4.90
MW-154A	B	BICA	Benzene	0.5	mg/L	0.0037	0.0010	0.0017	0.0017	0.0008	0.0011	0.00060	0.00078	0.00050
MW-154A	B	BICA	TDS	na	mg/L	15,800	9,080	9,080	9,080	9,100	9,800	7,610	7,390	21,000
MW-154A	B	BICA	D. O.	na	mg/L	0.8	1.6	0.7	0.7	1.9	1.7	1.6	1.8	2.4
MW-154A	B	BICA	ORP	na	mV	74.7	78.1	76.1	76.1	74.7	80.1	110.7	98.5	136.6
MW-154A	B	BICA	pH	na	stnd unit	6.70	6.65	6.70	6.70	7.02	6.98	6.68	6.69	6.43
MW-154A	B	BICA	Specific Conductance	na	µmhos/cm	15,500	11,290	10,120	10,120	9,270	10,130	10,190	10,090	11,100
MW-154A	B	BICA	Temperature	na	°C	23.00	19.3	24.5	24.5	19.0	23.1	26.6	18.9	25.8
MW-154A	B	BICA	Turbidity	na	NTU	5.50	7.40	6.40	6.40	5.90	6.10	6.00	6.20	5.10
MW-155	A	BICA	Benzene	0.5	mg/L	<0.0004	<0.0003	0.00047	0.0005	<0.0003	<0.0003	<0.00023	<0.00023	<0.00023
MW-155	A	BICA	TDS	na	mg/L	411	500	583	583	600	572	645	524	874
MW-155	A	BICA	D. O.	na	mg/L	5.1	6.1	4.4	4.4	3.3	3.5	5.4	6.0	5.8
MW-155	A	BICA	ORP	na	mV	80.2	63.7	(46.8)	(46.8)	34.0	41.2	104.4	127.8	5.7
MW-155	A	BICA	pH	na	stnd unit	7.14	7.19	7.29	7.29	6.44	7.07	7.27	7.41	7.37
MW-155	A	BICA	Specific Conductance	na	µmhos/cm	487	613	1,007	1,007	1,574	1,374	740	674	1,447
MW-155	A	BICA	Temperature	na	°C	21.20	20.9	25.2	25.2	17.9	24.7	25.6	19.3	23.8
MW-155	A	BICA	Turbidity	na	NTU	3.90	2.60	4.00	4.00	3.60	1.41	10.10	7.40	4.50
MW-155A	B	BICA	Benzene	0.5	mg/L	0.4320	0.3430	0.3860	0.3860	0.3500	0.3740	0.29500	0.18300	0.33100
MW-155A	B	BICA	TDS	na	mg/L	31,700	30,400	28,000	28,000	30,600	29,700	24,700	39,500	37,400

Table VI.B.3.b - GROUNDWATER MONITORING SYSTEM RESULTS - BICA and SITE E PROGRAMS

Alon USA LP - Big Spring Refinery

Well No.	Screen	Program	Constituent	$^{GW}GW_{Class3}$ (mg/L)	Units	PRE-PERMIT ANALYSIS								
						Jul-10	Jan-11	Jul-11	Jan-12	Jul-12	Jan-13	Jul-13	Jan-14	Jul-14
MW-155A	B	BICA	D. O.	na	mg/L	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-155A	B	BICA	ORP	na	mV	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-155A	B	BICA	pH	na	stnd unit	7.15	6.27	6.14	6.77	7.25	5.63	6.43	7.83	6.35
MW-155A	B	BICA	Specific Conductance	na	µmhos/cm	35,950	34,000	33,100	32	33,400	28,900	30,600	27,700	24,700
MW-155A	B	BICA	Temperature	na	°C	29.09	15.30	24.34	20.20	23.82	21.68	23.93	19.93	23.63
MW-155A	B	BICA	Turbidity	na	NTU	5.56	5.38	0.00	259.00	41.50	0.00	0.20	6.90	0.00
MW-163	A	BICA	Benzene	0.5	mg/L	<0.001	<0.001	<0.00025	<0.001	0.0005	<0.00035	<0.00034	<0.00034	0.0004
MW-163	A	BICA	TDS	na	mg/L	4,360	4,550	2,940	3,090	3,120	3,160	3,260	3,470	3,290
MW-163	A	BICA	D. O.	na	mg/L	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-163	A	BICA	ORP	na	mV	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-163	A	BICA	pH	na	stnd unit	6.42	6.05	6.44	6.76	7.37	6.59	7.17	6..49	6.52
MW-163	A	BICA	Specific Conductance	na	µmhos/cm	3,100	4,660	4,150	5	4,750	4,840	4,760	5	4,340
MW-163	A	BICA	Temperature	na	°C	26.86	22.06	24.13	23.78	25.14	22.82	24.34	22.44	25.60
MW-163	A	BICA	Turbidity	na	NTU	15.00	17.80	0.00	0.00	6.50	0.00	0.00	84.20	121.00
MW-163A	B	BICA	Benzene	0.5	mg/L	0.0045	0.0037	0.0042	0.0039	0.0033	0.0032	0.0044	0.0035	0.0088
MW-163A	B	BICA	TDS	na	mg/L	4,260	4,210	2,980	3,250	4,440	6,120	5,640	6,650	10,400
MW-163A	B	BICA	D. O.	na	mg/L	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-163A	B	BICA	ORP	na	mV	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-163A	B	BICA	pH	na	stnd unit	5.89	6.72	6.77	6.96	7.61	6.54	7.40	6.47	6.57
MW-163A	B	BICA	Specific Conductance	na	µmhos/cm	3,240	5,220	4,520	5	6,350	8,520	8,410	10,000	12,400
MW-163A	B	BICA	Temperature	na	°C	25.76	32.10	28.20	23.44	24.82	23.99	24.92	22.50	25.76
MW-163A	B	BICA	Turbidity	na	NTU	16.2	22.52	0	0	2.6	17.6	33.6	191	0
MW-165	A	BICA	Benzene	0.5	mg/L	<0.001	<0.001	<0.00025	<0.00025	<0.00025	<0.00034	0.0023	<0.00034	<0.00034
MW-165	A	BICA	TDS	na	mg/L	1,880	1,760	1,050	1,090	1,040	1,220	1,200	1,600	1,750
MW-165	A	BICA	D. O.	na	mg/L	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-165	A	BICA	ORP	na	mV	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-165	A	BICA	pH	na	stnd unit	7.25	6.63	7.20	7.21	7.81	7.69	6.88	7.05	6.67
MW-165	A	BICA	Specific Conductance	na	µmhos/cm	500	2,650	2,740	2	1,710	1,840	1,830	2,540	2,460
MW-165	A	BICA	Temperature	na	°C	23.70	20.40	24.24	17.13	23.82	19.95	22.24	20.09	23.03
MW-165	A	BICA	Turbidity	na	NTU	0.00	51.30	0.00	59.80	0.00	4.20	0.00	122.00	0.00
MW-165A	B	BICA	Benzene	0.5	mg/L	<0.001	<0.001	<0.00025	<0.00025	<0.00025	<0.00034	0.0024	0.0008	<0.00034
MW-165A	B	BICA	TDS	na	mg/L	953	960	890	812	737	741	833	762	755
MW-165A	B	BICA	D. O.	na	mg/L	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-165A	B	BICA	ORP	na	mV	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-165A	B	BICA	pH	na	stnd unit	7.6	7.0	7.0	7.4	8.8	6.1	7.6	7.8	7.6
MW-165A	B	BICA	Specific Conductance	na	µmhos/cm	1,320	1,370	1,710	1	2	1,120	3,700	10,000	0
MW-165A	B	BICA	Temperature	na	°C	25.00	21.39	29.09	19.67	21.71	19.76	21.41	19.29	22.20
MW-165A	B	BICA	Turbidity	na	NTU	23.40	2.90	0.00	22.30	338.00	4.50	69.40	800.00	260.00
MW-166	A	BICA	Benzene	0.5	mg/L	<0.001	<0.001	<0.00025	0.0011	<0.00025	0.0006	<0.00034	<0.00034	<0.00034
MW-166	A	BICA	TDS	na	mg/L	3,130	2,690	2,410	1,940	2,320	2,260	2,450	2,750	3,020
MW-166	A	BICA	D. O.	na	mg/L	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-166	A	BICA	ORP	na	mV	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-166	A	BICA	pH	na	stnd unit	6.97	7.58	7.21	9.39	7.40	5.83	7.42	7.00	6.89

Table VI.B.3.b - GROUNDWATER MONITORING SYSTEM RESULTS - BICA and SITE E PROGRAMS

Alon USA LP - Big Spring Refinery

Well No.	Screen	Program	Constituent	$^{GW}GW_{Class3}$ (mg/L)	Units	CURRENT PERMIT ANALYSIS								
						Mar-15	Jul-15	Jan-16	Jul-16	Jan-17	Jul-17	Jan-18	Jul-18	Jan-19
MW-155A	B	BICA	D. O.	na	mg/L	1.3	0.5	0.9	0.6	0.8	1.3	1.6	2.1	2.0
MW-155A	B	BICA	ORP	na	mV	nm	nm	nm	(138.0)	(105.7)	(87.8)	(50.1)	(154.8)	(95.9)
MW-155A	B	BICA	pH	na	stnd unit	6.92	6.64	6.36	6.43	7.04	6.45	6.74	6.39	6.38
MW-155A	B	BICA	Specific Conductance	na	µmhos/cm	nm	nm	nm	nm	nm	nm	36,800	41,500	40,400
MW-155A	B	BICA	Temperature	na	°C	nm	nm	nm	nm	nm	nm	20.70	25.00	19.80
MW-155A	B	BICA	Turbidity	na	NTU	nm	nm	nm	nm	nm	nm	6.90	6.00	6.70
MW-163	A	BICA	Benzene	0.5	mg/L	<0.00034	<0.00034	<0.00047	<0.00047	<0.00047	0.0004	<0.0003	<0.0004	<0.0004
MW-163	A	BICA	TDS	na	mg/L	3,220	3,230	2,810	3,710	3,020	3,000	2,540	2,630	2,460
MW-163	A	BICA	D. O.	na	mg/L	1.9	2.5	2.4	1.9	1.4	1.4	0.6	0.7	1.7
MW-163	A	BICA	ORP	na	mV	nm	nm	nm	40.3	9.8	23.4	(53.2)	(56.1)	(78.4)
MW-163	A	BICA	pH	na	stnd unit	6.61	6.57	6.64	6.66	6.51	6.61	6.92	6.91	7.05
MW-163	A	BICA	Specific Conductance	na	µmhos/cm	nm	nm	nm	nm	nm	nm	3,910	3,810	3,920
MW-163	A	BICA	Temperature	na	°C	nm	nm	nm	nm	nm	nm	23.80	24.00	22.10
MW-163	A	BICA	Turbidity	na	NTU	nm	nm	nm	nm	nm	nm	7.10	7.90	8.30
MW-163A	B	BICA	Benzene	0.5	mg/L	1.0600	0.0023	0.0142	<0.00047	<0.00047	0.0005	<0.0003	<0.0004	<0.0004
MW-163A	B	BICA	TDS	na	mg/L	14,400	3,990	6,010	3,600	4,190	5,930	6,720	5,710	4,580
MW-163A	B	BICA	D. O.	na	mg/L	1.6	2.9	0.9	1.0	0.8	1.0	1.5	1.4	1.4
MW-163A	B	BICA	ORP	na	mV	nm	nm	nm	(85.5)	(92.0)	(45.1)	(121.7)	(105.7)	(101.1)
MW-163A	B	BICA	pH	na	stnd unit	6.38	6.70	6.59	6.61	6.59	6.69	6.91	6.96	7.13
MW-163A	B	BICA	Specific Conductance	na	µmhos/cm	nm	nm	nm	nm	nm	nm	8,610	8,430	5,700
MW-163A	B	BICA	Temperature	na	°C	nm	nm	nm	nm	nm	nm	24.20	24.60	22.50
MW-163A	B	BICA	Turbidity	na	NTU	nm	nm	nm	nm	nm	nm	5.5	5.4	6.1
MW-165	A	BICA	Benzene	0.5	mg/L	<0.00034	<0.00034	<0.00047	<0.00047	<0.00047	<0.0003	<0.0003	<0.0004	Well
MW-165	A	BICA	TDS	na	mg/L	1,390	1,390	1,270	1,150	1,220	955	699	683	P&A'd
MW-165	A	BICA	D. O.	na	mg/L	2.5	3.7	4.6	4.4	4.6	4.1	3.6	3.1	Due To
MW-165	A	BICA	ORP	na	mV	nm	nm	nm	-39.1	-16.2	-23.7	-79.6	-79.6	Expansion
MW-165	A	BICA	pH	na	stnd unit	7.51	7.03	6.94	6.96	7.46	6.94	7.28	6.84	of
MW-165	A	BICA	Specific Conductance	na	µmhos/cm	nm	nm	nm	nm	nm	nm	1,200	1,086	Trailer Park
MW-165	A	BICA	Temperature	na	°C	nm	nm	nm	nm	nm	nm	20.10	22.50	To Be
MW-165	A	BICA	Turbidity	na	NTU	nm	nm	nm	nm	nm	nm	33.60	6.50	Replaced
MW-165A	B	BICA	Benzene	0.5	mg/L	0.0013	<0.00034	<0.00047	<0.00047	<0.00047	<0.0003	<0.0003	<0.0004	Well
MW-165A	B	BICA	TDS	na	mg/L	596	625	542	677	730	698	798	867	P&A'd
MW-165A	B	BICA	D. O.	na	mg/L	1.1	4.2	5.4	2.5	2.1	3.5	2.9	3.1	Due To
MW-165A	B	BICA	ORP	na	mV	nm	nm	nm	49.3	46.4	59.1	-56.5	-62.9	Expansion
MW-165A	B	BICA	pH	na	stnd unit	5.9	7.1	7.2	6.8	7.4	7.2	7.1	7.0	of
MW-165A	B	BICA	Specific Conductance	na	µmhos/cm	nm	nm	nm	nm	nm	nm	1,105	1,172	Trailer Park
MW-165A	B	BICA	Temperature	na	°C	nm	nm	nm	nm	nm	nm	20.40	23.20	To Be
MW-165A	B	BICA	Turbidity	na	NTU	nm	nm	nm	nm	nm	nm	3.40	3.70	Replaced
MW-166	A	BICA	Benzene	0.5	mg/L	<0.00034	<0.00034	<0.00047	<0.00047	<0.00047	<0.0003	<0.0003	<0.0004	<0.0004
MW-166	A	BICA	TDS	na	mg/L	2,990	2,810	2,470	2,450	2,380	2,260	2,250	2,660	2,650
MW-166	A	BICA	D. O.	na	mg/L	1.7	4.3	6.0	5.1	5.7	4.8	5.7	4.7	5.3
MW-166	A	BICA	ORP	na	mV	nm	nm	nm	32.3	106.2	96.1	77.3	85.8	26.8
MW-166	A	BICA	pH	na	stnd unit	6.99	6.94	7.20	7.07	7.19	7.21	7.13	7.13	7.01

Table VI.B.3.b - GROUNDWATER MONITORING SYSTEM RESULTS - BICA and SITE E PROGRAMS

Alon USA LP - Big Spring Refinery

Well No.	Screen	Program	Constituent	$^{GW}GW_{Class3}$ (mg/L)	Units	CURRENT PERMIT ANALYSIS								
						Jul-19	Jan-20	Jul-20	Jan-21	Jul-21	Jan-22	Jul-22	Jan-23	Jul-23
MW-155A	B	BICA	D. O.	na	mg/L	1.6	1.1	1.5	1.5	2.1	1.8	1.0	1.1	1.5
MW-155A	B	BICA	ORP	na	mV	(140.7)	(113.8)	(100.5)	(100.5)	(103.4)	(113.1)	(105.4)	(65.8)	(77.6)
MW-155A	B	BICA	pH	na	stnd unit	6.93	6.56	6.60	6.60	6.57	5.97	6.57	6.89	6.75
MW-155A	B	BICA	Specific Conductance	na	µmhos/cm	34,900	38,700	28,000	28,000	26,800	34,700	27,600	20,400	33,100
MW-155A	B	BICA	Temperature	na	°C	21.90	20.6	25.6	25.6	14.9	25.6	27.5	16.5	24.4
MW-155A	B	BICA	Turbidity	na	NTU	7.10	7.90	13.40	13.40	13.00	5.80	17.80	9.50	6.90
MW-163	A	BICA	Benzene	0.5	mg/L	<0.0004	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	0.00057	<0.00023	0.00023
MW-163	A	BICA	TDS	na	mg/L	2,810	2,570	2,730	2,730	2,830	2,700	2,600	2,600	2,570
MW-163	A	BICA	D. O.	na	mg/L	2.1	2.6	1.8	1.8	1.9	1.2	1.4	1.6	2.3
MW-163	A	BICA	ORP	na	mV	(67.9)	(54.9)	(95.6)	(95.6)	(34.0)	(54.7)	(103.6)	19.5	(91.4)
MW-163	A	BICA	pH	na	stnd unit	6.74	6.54	6.63	6.63	6.74	6.51	6.16	5.90	5.86
MW-163	A	BICA	Specific Conductance	na	µmhos/cm	3,360	3,550	3,710	3,710	3,960	4,110	3,800	3,720	3,980
MW-163	A	BICA	Temperature	na	°C	23.5	21.7	23.5	23.5	22.7	24.9	27.1	15.1	23.2
MW-163	A	BICA	Turbidity	na	NTU	9.10	9.90	7.20	7.20	6.70	6.90	7.20	6.00	5.20
MW-163A	B	BICA	Benzene	0.5	mg/L	<0.0004	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.00023	<0.00023	0.00700
MW-163A	B	BICA	TDS	na	mg/L	5,240	3,480	4,550	4,550	3,650	4,350	5,910	3,930	40,000
MW-163A	B	BICA	D. O.	na	mg/L	1.1	1.8	1.0	1.0	2.2	1.8	1.6	1.1	2.3
MW-163A	B	BICA	ORP	na	mV	(56.8)	(67.3)	(70.2)	(70.2)	(34.8)	(15.5)	(0.3)	47.2	(84.6)
MW-163A	B	BICA	pH	na	stnd unit	6.93	6.87	6.92	6.92	6.95	6.88	6.82	6.93	6.86
MW-163A	B	BICA	Specific Conductance	na	µmhos/cm	5,610	4,840	4,830	4,830	5,700	5,730	8,000	7,020	5,920
MW-163A	B	BICA	Temperature	na	°C	24.5	21.6	24.5	24.5	22.4	25.6	27.3	18.4	22.7
MW-163A	B	BICA	Turbidity	na	NTU	5.10	3.50	7.00	7.00	8.30	7.40	8.30	8.10	4.20
MW-165	A	BICA	Benzene	0.5	mg/L	Well	Well	Well		<0.0003	<0.0003	<0.00023	<0.00023	<0.00023
MW-165	A	BICA	TDS	na	mg/L	P&A'd	P&A'd	P&A'd	*Well*	540	517	535	492	798
MW-165	A	BICA	D. O.	na	mg/L	Due To	Due To	Due To	*P&A'd*	4.3	3.6	3.9	5.6	4.3
MW-165	A	BICA	ORP	na	mV	Expansion	Expansion	Expansion	*Replaced*	138.6	155.0	120.7	146.8	125.8
MW-165	A	BICA	pH	na	stnd unit	of	of	of	*and*	6.57	6.33	6.80	7.04	6.99
MW-165	A	BICA	Specific Conductance	na	µmhos/cm	Trailer Park	Trailer Park	Trailer Park	*Developed*	991	881	629	617	1,133
MW-165	A	BICA	Temperature	na	°C	To Be	To Be	To Be	*Jan-2021*	23.60		26.7	14.9	24.0
MW-165	A	BICA	Turbidity	na	NTU	Replaced	Replaced	Replaced		20.50	8.10	10.40	12.10	4.60
MW-165A	B	BICA	Benzene	0.5	mg/L	Well	Well	Well		<0.0003	<0.0003	<0.00023	<0.00023	<0.00023
MW-165A	B	BICA	TDS	na	mg/L	P&A'd	P&A'd	P&A'd	*Well*	1,630	1,710	1,940	1,970	2,400
MW-165A	B	BICA	D. O.	na	mg/L	Due To	Due To	Due To	*P&A'd*	1.1	1.2	1.1	1.0	1.1
MW-165A	B	BICA	ORP	na	mV	Expansion	Expansion	Expansion	*Replaced*	122.9	94.4	136.9	139.4	51.6
MW-165A	B	BICA	pH	na	stnd unit	of	of	of	*and*	6.98	7.41	6.99	7.25	6.99
MW-165A	B	BICA	Specific Conductance	na	µmhos/cm	Trailer Park	Trailer Park	Trailer Park	*Developed*	2,910	2,750	2,120	1,824	3,170
MW-165A	B	BICA	Temperature	na	°C	To Be	To Be	To Be	*Jan-2021*	23.70	19.7	26.4	17.9	23.4
MW-165A	B	BICA	Turbidity	na	NTU	Replaced	Replaced	Replaced		18.60	2.50	12.90	8.80	5.80
MW-166	A	BICA	Benzene	0.5	mg/L	<0.0004	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.00023	<0.00023	<0.00023
MW-166	A	BICA	TDS	na	mg/L	2,600	2,730	2,480	2,480	2,430	2,320	2,370	2,480	3,210
MW-166	A	BICA	D. O.	na	mg/L	5.2	5.1	3.4	3.4	3.3	4.3	4.5	5.7	4.4
MW-166	A	BICA	ORP	na	mV	36.2	2.4	62.6	62.6	(8.3)	115.0	74.0	96.1	72.5
MW-166	A	BICA	pH	na	stnd unit	7.15	7.02	7.03	7.03	7.11	7.00	7.10	7.34	7.03

Table VI.B.3.b - GROUNDWATER MONITORING SYSTEM RESULTS - BICA and SITE E PROGRAMS

Alon USA LP - Big Spring Refinery

Well No.	Screen	Program	Constituent	$^{GW}GW_{Class3}$ (mg/L)	Units	PRE-PERMIT ANALYSIS								
						Jul-10	Jan-11	Jul-11	Jan-12	Jul-12	Jan-13	Jul-13	Jan-14	Jul-14
MW-166	A	BICA	Specific Conductance	na	µmhos/cm	9,900	4,150	3,460	3	3,490	3,390	3,720	4,140	4,320
MW-166	A	BICA	Temperature	na	°C	23.20	15.90	27.13	20.61	21.59	21.30	20.32	19.76	21.94
MW-166	A	BICA	Turbidity	na	NTU	0.00	0.00	0.00	0.00	2.00	0.00	0.00	76.90	0.00
MW-166A	B	BICA	Benzene	0.5	mg/L	<0.001	<0.001	<0.00025	<0.00025	<0.00025	0.0009	<0.00034	<0.00034	<0.00034
MW-166A	B	BICA	TDS	na	mg/L	2,230	2,040	2,290	2,420	2,510	1,580	2,480	2,230	1,850
MW-166A	B	BICA	D. O.	na	mg/L	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-166A	B	BICA	ORP	na	mV	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-166A	B	BICA	pH	na	stnd unit	7.82	7.39	7.90	8.07	7.92	9.73	6.86	7.80	6.90
MW-166A	B	BICA	Specific Conductance	na	µmhos/cm	1,000	3	2,930	4	2,690	2,460	3,440	3,060	1
MW-166A	B	BICA	Temperature	na	°C	23.40	16.90	25.90	20.67	21.15	19.60	27.40	19.01	22.26
MW-166A	B	BICA	Turbidity	na	NTU	2.40	0.00	0.00	0.00	350.00	2.10	0.00	4.50	254.00
RW-173	A	BICA	Benzene	0.5	mg/L	PSH	PSH	PSH	PSH	PSH	PSH	PSH	PSH	PSH
RW-173	A	BICA	TDS	na	mg/L	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness
RW-173	A	BICA	D. O.	na	mg/L	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet
RW-173	A	BICA	ORP	na	mV	3.76	3.59	3.68	4.48	4.87	2.7	0.65	4.3	3.13
RW-173	A	BICA	pH	na	stnd unit	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-173	A	BICA	Specific Conductance	na	µmhos/cm	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-173	A	BICA	Temperature	na	°C	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-173	A	BICA	Turbidity	na	NTU	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-174	A	BICA	Benzene	0.5	mg/L	PSH	PSH	PSH	PSH	PSH	PSH	PSH	PSH	PSH
RW-174	A	BICA	TDS	na	mg/L	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness
RW-174	A	BICA	D. O.	na	mg/L	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet
RW-174	A	BICA	ORP	na	mV	4.19	4.07	4.03	4.22	4.95	4.70	5.38	5.52	0.11
RW-174	A	BICA	pH	na	stnd unit	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-174	A	BICA	Specific Conductance	na	µmhos/cm	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-174	A	BICA	Temperature	na	°C	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-174	A	BICA	Turbidity	na	NTU	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-175	A	BICA	Benzene	0.5	mg/L	DRY	PSH	DRY	DRY	DRY	DRY	PSH	PSH	PSH
RW-175	A	BICA	TDS	na	mg/L	DRY	Thickness	DRY	DRY	DRY	DRY	Thickness	Thickness	Thickness
RW-175	A	BICA	D. O.	na	mg/L	DRY	In Feet	DRY	DRY	DRY	DRY	In Feet	In Feet	In Feet
RW-175	A	BICA	ORP	na	mV	DRY	0.11	DRY	DRY	DRY	DRY	0.05	7.16	0.18
RW-175	A	BICA	pH	na	stnd unit	DRY	nm	DRY	DRY	DRY	DRY	nm	nm	nm
RW-175	A	BICA	Specific Conductance	na	µmhos/cm	DRY	nm	DRY	DRY	DRY	DRY	nm	nm	nm
RW-175	A	BICA	Temperature	na	°C	DRY	nm	DRY	DRY	DRY	DRY	nm	nm	nm
RW-175	A	BICA	Turbidity	na	NTU	DRY	nm	DRY	DRY	DRY	DRY	nm	nm	nm
RW-177	A	BICA	Benzene	0.5	mg/L	PSH	PSH	PSH	PSH	PSH	PSH	PSH	PSH	PSH
RW-177	A	BICA	TDS	na	mg/L	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness
RW-177	A	BICA	D. O.	na	mg/L	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet
RW-177	A	BICA	ORP	na	mV	3.75	1.68	1.59	2.78	3.48	3.45	1.55	Emulsion	1.10
RW-177	A	BICA	pH	na	stnd unit	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-177	A	BICA	Specific Conductance	na	µmhos/cm	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-177	A	BICA	Temperature	na	°C	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-177	A	BICA	Turbidity	na	NTU	nm	nm	nm	nm	nm	nm	nm	nm	nm

Table VI.B.3.b - GROUNDWATER MONITORING SYSTEM RESULTS - BICA and SITE E PROGRAMS

Alon USA LP - Big Spring Refinery

Well No.	Screen	Program	Constituent	$^{GW}GW_{Class3}$ (mg/L)	Units	CURRENT PERMIT ANALYSIS								
						Mar-15	Jul-15	Jan-16	Jul-16	Jan-17	Jul-17	Jan-18	Jul-18	Jan-19
MW-166	A	BICA	Specific Conductance	na	µmhos/cm	nm	nm	nm	nm	nm	nm	3,280	2,140	3,420
MW-166	A	BICA	Temperature	na	°C	nm	nm	nm	nm	nm	nm	17.70	22.60	16.00
MW-166	A	BICA	Turbidity	na	NTU	nm	nm	nm	nm	nm	nm	5.00	1.80	2.70
MW-166A	B	BICA	Benzene	0.5	mg/L	<0.00034	<0.00034	<0.00047	<0.00047	<0.00047	<0.0003	<0.0003	<0.0004	<0.0004
MW-166A	B	BICA	TDS	na	mg/L	1,940	2,800	2,710	2,890	2,620	2,520	2,200	2,840	2,780
MW-166A	B	BICA	D. O.	na	mg/L	1.7	5.1	5.3	4.2	5.3	2.7	5.4	4.5	5.0
MW-166A	B	BICA	ORP	na	mV	nm	nm	nm	65.3	133.1	82.6	87.4	84.7	42.3
MW-166A	B	BICA	pH	na	stnd unit	5.92	6.85	7.05	6.91	6.96	6.67	6.94	6.93	6.88
MW-166A	B	BICA	Specific Conductance	na	µmhos/cm	nm	nm	nm	nm	nm	nm	3,160	2,240	3,790
MW-166A	B	BICA	Temperature	na	°C	nm	nm	nm	nm	nm	nm	18.20	22.10	16.20
MW-166A	B	BICA	Turbidity	na	NTU	nm	nm	nm	nm	nm	nm	2.60	1.50	1.10
RW-173	A	BICA	Benzene	0.5	mg/L	PSH	PSH	PSH	PSH	PSH	PSH	PSH	PSH	PSH
RW-173	A	BICA	TDS	na	mg/L	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness
RW-173	A	BICA	D. O.	na	mg/L	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet
RW-173	A	BICA	ORP	na	mV	3.48	3.27	1.81	0	0.15	3.56	4.19	4.8	4.9
RW-173	A	BICA	pH	na	stnd unit	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-173	A	BICA	Specific Conductance	na	µmhos/cm	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-173	A	BICA	Temperature	na	°C	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-173	A	BICA	Turbidity	na	NTU	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-174	A	BICA	Benzene	0.5	mg/L	PSH	PSH	PSH	PSH	PSH	PSH	PSH	PSH	PSH
RW-174	A	BICA	TDS	na	mg/L	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness
RW-174	A	BICA	D. O.	na	mg/L	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet
RW-174	A	BICA	ORP	na	mV	3.66	3.57	Emulsion	Emulsion	Emulsion	Emulsion	2.17	4.46	4.52
RW-174	A	BICA	pH	na	stnd unit	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-174	A	BICA	Specific Conductance	na	µmhos/cm	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-174	A	BICA	Temperature	na	°C	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-174	A	BICA	Turbidity	na	NTU	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-175	A	BICA	Benzene	0.5	mg/L	PSH	PSH	PSH	PSH	PSH	PSH	PSH	PSH	PSH
RW-175	A	BICA	TDS	na	mg/L	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness
RW-175	A	BICA	D. O.	na	mg/L	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet
RW-175	A	BICA	ORP	na	mV	4.31	4.16	2.98	0.00	4.53	0.08	5.54	5.88	5.88
RW-175	A	BICA	pH	na	stnd unit	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-175	A	BICA	Specific Conductance	na	µmhos/cm	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-175	A	BICA	Temperature	na	°C	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-175	A	BICA	Turbidity	na	NTU	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-177	A	BICA	Benzene	0.5	mg/L	PSH	PSH	PSH	PSH	PSH	PSH	PSH	PSH	PSH
RW-177	A	BICA	TDS	na	mg/L	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness
RW-177	A	BICA	D. O.	na	mg/L	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet
RW-177	A	BICA	ORP	na	mV	0.04	Emulsion	Emulsion	Emulsion	Emulsion	0.47	2.78	3.68	2.42
RW-177	A	BICA	pH	na	stnd unit	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-177	A	BICA	Specific Conductance	na	µmhos/cm	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-177	A	BICA	Temperature	na	°C	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-177	A	BICA	Turbidity	na	NTU	nm	nm	nm	nm	nm	nm	nm	nm	nm

Table VI.B.3.b - GROUNDWATER MONITORING SYSTEM RESULTS - BICA and SITE E PROGRAMS

Alon USA LP - Big Spring Refinery

Well No.	Screen	Program	Constituent	$^{GW}GW_{Class3}$ (mg/L)	Units	CURRENT PERMIT ANALYSIS								
						Jul-19	Jan-20	Jul-20	Jan-21	Jul-21	Jan-22	Jul-22	Jan-23	Jul-23
MW-166	A	BICA	Specific Conductance	na	µmhos/cm	4,170	3,650	3,440	3,440	3,120	4,640	3,070	2,660	2,310
MW-166	A	BICA	Temperature	na	°C	22.2	20.4	25.0	25.0	18.7	23.3	23.7	18.5	23.8
MW-166	A	BICA	Turbidity	na	NTU	3.30	1.40	6.20	6.20	5.80	8.70	9.40	8.70	6.90
MW-166A	B	BICA	Benzene	0.5	mg/L	<0.0004	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.00023	<0.00023	<0.00023
MW-166A	B	BICA	TDS	na	mg/L	3,100	2,660	2,580	2,580	2,490	2,310	2,250	2,710	3,080
MW-166A	B	BICA	D. O.	na	mg/L	4.8	4.3	3.5	3.5	3.0	4.1	4.1	5.5	4.7
MW-166A	B	BICA	ORP	na	mV	51.9	123.1	63.6	63.6	(54.2)	122.0	85.8	111.6	100.4
MW-166A	B	BICA	pH	na	stnd unit	7.04	6.99	7.02	7.02	6.93	6.94	7.05	7.25	6.82
MW-166A	B	BICA	Specific Conductance	na	µmhos/cm	4,870	4,820	3,760	3,760	4,980	4,770	2,790	2,670	3,670
MW-166A	B	BICA	Temperature	na	°C	22.4	20.4	24.7	24.7	18.6	22.5	23.6	19.2	24.2
MW-166A	B	BICA	Turbidity	na	NTU	3.40	1.30	2.70	2.70	6.60	4.00	16.20	3.00	3.80
RW-173	A	BICA	Benzene	0.5	mg/L	PSH	PSH	PSH	PSH	PSH	PSH	PSH	PSH	PSH
RW-173	A	BICA	TDS	na	mg/L	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness
RW-173	A	BICA	D. O.	na	mg/L	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet
RW-173	A	BICA	ORP	na	mV	3.23	3.65	3.05	0.23	2.69	0.02	0.51	0.49	0.60
RW-173	A	BICA	pH	na	stnd unit	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-173	A	BICA	Specific Conductance	na	µmhos/cm	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-173	A	BICA	Temperature	na	°C	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-173	A	BICA	Turbidity	na	NTU	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-174	A	BICA	Benzene	0.5	mg/L	PSH	PSH	PSH	PSH	PSH	PSH	PSH	PSH	PSH
RW-174	A	BICA	TDS	na	mg/L	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness
RW-174	A	BICA	D. O.	na	mg/L	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet
RW-174	A	BICA	ORP	na	mV	3.66	3.60	3.64	3.57	3.52	3.36	Emulsion	Emulsion	Emulsion
RW-174	A	BICA	pH	na	stnd unit	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-174	A	BICA	Specific Conductance	na	µmhos/cm	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-174	A	BICA	Temperature	na	°C	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-174	A	BICA	Turbidity	na	NTU	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-175	A	BICA	Benzene	0.5	mg/L	PSH	PSH	PSH	PSH	PSH	PSH	PSH	PSH	PSH
RW-175	A	BICA	TDS	na	mg/L	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness
RW-175	A	BICA	D. O.	na	mg/L	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet
RW-175	A	BICA	ORP	na	mV	5.42	5.07	4.15	4.37	3.88	3.90	1.21	1.20	1.15
RW-175	A	BICA	pH	na	stnd unit	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-175	A	BICA	Specific Conductance	na	µmhos/cm	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-175	A	BICA	Temperature	na	°C	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-175	A	BICA	Turbidity	na	NTU	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-177	A	BICA	Benzene	0.5	mg/L	PSH	PSH	PSH	PSH	PSH	PSH	PSH	PSH	PSH
RW-177	A	BICA	TDS	na	mg/L	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness
RW-177	A	BICA	D. O.	na	mg/L	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet
RW-177	A	BICA	ORP	na	mV	0.93	1.63	1.45	1.35	1.32	1.25	1.20	1.13	1.11
RW-177	A	BICA	pH	na	stnd unit	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-177	A	BICA	Specific Conductance	na	µmhos/cm	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-177	A	BICA	Temperature	na	°C	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-177	A	BICA	Turbidity	na	NTU	nm	nm	nm	nm	nm	nm	nm	nm	nm

Table VI.B.3.b - GROUNDWATER MONITORING SYSTEM RESULTS - BICA and SITE E PROGRAMS

Alon USA LP - Big Spring Refinery

Well No.	Screen	Program	Constituent	$^{GW}GW_{Class3}$ (mg/L)	Units	PRE-PERMIT ANALYSIS								
						Jul-10	Jan-11	Jul-11	Jan-12	Jul-12	Jan-13	Jul-13	Jan-14	Jul-14
RW-178	A	BICA	**Benzene**	**0.5**	**mg/L**	PSH	PSH	PSH	PSH	PSH	PSH	PSH	PSH	PSH
RW-178	A	BICA	**TDS**	**na**	**mg/L**	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness
RW-178	A	BICA	**D. O.**	**na**	**mg/L**	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet
RW-178	A	BICA	**ORP**	**na**	**mV**	3.75	1.68	1.59	2.78	3.48	3.45	1.55	0.00	1.10
RW-178	A	BICA	**pH**	**na**	**stnd unit**	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-178	A	BICA	**Specific Conductance**	**na**	**µmhos/cm**	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-178	A	BICA	**Temperature**	**na**	**°C**	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-178	A	BICA	**Turbidity**	**na**	**NTU**	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-179	A	BICA	**Benzene**	**0.5**	**mg/L**	PSH	PSH	PSH	PSH	PSH	DRY	PSH	PSH	DRY
RW-179	A	BICA	**1,2-DCA**	**0.05**	**mg/L**	Thickness	Thickness	Thickness	Thickness	Thickness	DRY	Thickness	Thickness	DRY
RW-179	A	BICA	**Arsenic**	**1**	**mg/L**	In Feet	In Feet	In Feet	In Feet	In Feet	DRY	In Feet	In Feet	DRY
RW-179	A	BICA	**TDS**	**na**	**mg/L**	5.30	5.22	5.34	5.86	6.40	DRY	3.37	6.55	DRY
RW-179	A	BICA	**D. O.**	**na**	**mg/L**	nm	nm	nm	nm	nm	DRY	nm	nm	DRY
RW-179	A	BICA	**ORP**	**na**	**mV**	nm	nm	nm	nm	nm	DRY	nm	nm	DRY
RW-179	A	BICA	**pH**	**na**	**stnd unit**	nm	nm	nm	nm	nm	DRY	nm	nm	DRY
RW-179	A	BICA	**Specific Conductance**	**na**	**µmhos/cm**	nm	nm	nm	nm	nm	DRY	nm	nm	DRY
RW-179	A	BICA	**Temperature**	**na**	**°C**	nm	nm	nm	nm	nm	DRY	nm	nm	DRY
RW-179	A	BICA	**Turbidity**	**na**	**NTU**	nm	nm	nm	nm	nm	DRY	nm	nm	DRY
RW-185	A	BICA	**Benzene**	**0.05**	**mg/L**	PSH	PSH	PSH	PSH	PSH	PSH	PSH	PSH	PSH
RW-185	A	BICA	**TDS**	**na**	**mg/L**	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness
RW-185	A	BICA	**D. O.**	**na**	**mg/L**	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet
RW-185	A	BICA	**ORP**	**na**	**mV**	5.98	5.11	5.09	6.36	6.85	6.37	6.91	6.93	8.85
RW-185	A	BICA	**pH**	**na**	**stnd unit**	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-185	A	BICA	**Specific Conductance**	**na**	**µmhos/cm**	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-185	A	BICA	**Temperature**	**na**	**°C**	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-185	A	BICA	**Turbidity**	**na**	**NTU**	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-192	A	BICA	**Benzene**	**0.5**	**mg/L**	PSH	PSH	PSH	PSH	PSH	PSH	PSH	PSH	PSH
RW-192	A	BICA	**1,2-DCA**	**0.5**	**mg/L**	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness
RW-192	A	BICA	**Arsenic**	**1**	**mg/L**	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet
RW-192	A	BICA	**TDS**	**na**	**mg/L**	4.19	Emulsion	Emulsion	7.89	8.15	7.80	8.65	Emulsion	7.72
RW-192	A	BICA	**D. O.**	**na**	**mg/L**	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-192	A	BICA	**ORP**	**na**	**mV**	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-192	A	BICA	**pH**	**na**	**stnd unit**	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-192	A	BICA	**Specific Conductance**	**na**	**µmhos/cm**	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-192	A	BICA	**Temperature**	**na**	**°C**	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-192	A	BICA	**Turbidity**	**na**	**NTU**	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-194	C	BICA	**Benzene**	**0.5**	**mg/L**	0.02000	0.07900	Off-Line	<0.00025	Off-Line	0.00040	0.02100	0.02270	0.00290
RW-194	C	BICA	**1,2-DCA**	**0.5**	**mg/L**	0.0041	0.0290	Off-Line	0.0067	Off-Line	0.0281	0.0175	0.0249	0.0181
RW-194	C	BICA	**Arsenic**	**1**	**mg/L**	0.0481	<0.1	Off-Line	0.0173	Off-Line	0.0067	0.0081	0.0085	0.0108
RW-194	C	BICA	**TDS**	**na**	**mg/L**	18,100	14,900	Off-Line	10,400	Off-Line	14,500	13,000	14,700	15,000
RW-194	C	BICA	**D. O.**	**na**	**mg/L**	nm	nm	Off-Line	nm	Off-Line	nm	nm	nm	nm
RW-194	C	BICA	**ORP**	**na**	**mV**	nm	nm	Off-Line	nm	Off-Line	nm	nm	nm	nm
RW-194	C	BICA	**pH**	**na**	**stnd unit**	6.86	5.96	Off-Line	7.31	Off-Line	6.62	6.64	7.31	6.23
RW-194	C	BICA	**Specific Conductance**	**na**	**µmhos/cm**	23,900	24,300	Off-Line	17,800	Off-Line	26,600	20,500	23	23,500

Table VI.B.3.b - GROUNDWATER MONITORING SYSTEM RESULTS - BICA and SITE E PROGRAMS

Alon USA LP - Big Spring Refinery

Well No.	Screen	Program	Constituent	$^{GW}GW_{Class3}$ (mg/L)	Units	CURRENT PERMIT ANALYSIS								
						Mar-15	Jul-15	Jan-16	Jul-16	Jan-17	Jul-17	Jan-18	Jul-18	Jan-19
RW-178	A	BICA	**Benzene**	**0.5**	**mg/L**	PSH	PSH	PSH	PSH	PSH	PSH	PSH	PSH	PSH
RW-178	A	BICA	**TDS**	**na**	**mg/L**	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness
RW-178	A	BICA	**D. O.**	**na**	**mg/L**	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet
RW-178	A	BICA	**ORP**	**na**	**mV**	0.04	0.00	0.00	0.00	0.00	0.47	2.78	3.68	2.42
RW-178	A	BICA	**pH**	**na**	**stnd unit**	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-178	A	BICA	**Specific Conductance**	**na**	**µmhos/cm**	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-178	A	BICA	**Temperature**	**na**	**°C**	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-178	A	BICA	**Turbidity**	**na**	**NTU**	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-179	A	BICA	**Benzene**	**0.5**	**mg/L**	PSH	PSH	PSH	PSH	PSH	PSH	PSH	PSH	PSH
RW-179	A	BICA	**1,2-DCA**	**0.05**	**mg/L**	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness
RW-179	A	BICA	**Arsenic**	**1**	**mg/L**	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet
RW-179	A	BICA	**TDS**	**na**	**mg/L**	4.73	4.71	0.33	0.01	3.52	0.01	0.96	4.29	4.65
RW-179	A	BICA	**D. O.**	**na**	**mg/L**	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-179	A	BICA	**ORP**	**na**	**mV**	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-179	A	BICA	**pH**	**na**	**stnd unit**	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-179	A	BICA	**Specific Conductance**	**na**	**µmhos/cm**	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-179	A	BICA	**Temperature**	**na**	**°C**	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-179	A	BICA	**Turbidity**	**na**	**NTU**	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-185	A	BICA	**Benzene**	**0.05**	**mg/L**	PSH	PSH	PSH	PSH	PSH	PSH	PSH	PSH	PSH
RW-185	A	BICA	**TDS**	**na**	**mg/L**	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness
RW-185	A	BICA	**D. O.**	**na**	**mg/L**	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet
RW-185	A	BICA	**ORP**	**na**	**mV**	5.80	5.34	4.81	3.21	3.22	3.42	0.00	6.85	7.07
RW-185	A	BICA	**pH**	**na**	**stnd unit**	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-185	A	BICA	**Specific Conductance**	**na**	**µmhos/cm**	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-185	A	BICA	**Temperature**	**na**	**°C**	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-185	A	BICA	**Turbidity**	**na**	**NTU**	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-192	A	BICA	**Benzene**	**0.5**	**mg/L**	PSH	PSH	PSH	PSH	PSH	PSH	PSH	PSH	PSH
RW-192	A	BICA	**1,2-DCA**	**0.5**	**mg/L**	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness
RW-192	A	BICA	**Arsenic**	**1**	**mg/L**	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet
RW-192	A	BICA	**TDS**	**na**	**mg/L**	7.17	6.87	6.68	0.01	Emulsion	0.17	3.73	3.92	3.18
RW-192	A	BICA	**D. O.**	**na**	**mg/L**	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-192	A	BICA	**ORP**	**na**	**mV**	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-192	A	BICA	**pH**	**na**	**stnd unit**	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-192	A	BICA	**Specific Conductance**	**na**	**µmhos/cm**	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-192	A	BICA	**Temperature**	**na**	**°C**	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-192	A	BICA	**Turbidity**	**na**	**NTU**	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-194	C	BICA	**Benzene**	**0.5**	**mg/L**	<0.00034	<0.00034	<0.00047	0.02010	0.02740	0.02870	0.03050	0.02660	0.00071
RW-194	C	BICA	**1,2-DCA**	**0.5**	**mg/L**	<0.00035	0.0158	0.0115	0.0101	0.0108	0.0106	0.0119	0.0103	0.0180
RW-194	C	BICA	**Arsenic**	**1**	**mg/L**	0.0058	0.0099	0.0046	0.0043	0.0031	0.0024	0.0019	0.0010	0.0184
RW-194	C	BICA	**TDS**	**na**	**mg/L**	18,100	17,000	13,500	13,300	11,600	12,600	12,100	14,600	11,600
RW-194	C	BICA	**D. O.**	**na**	**mg/L**	2.4	0.8	3.2	2.7	3.4	4.6	5.1	4.9	3.9
RW-194	C	BICA	**ORP**	**na**	**mV**	nm	nm	nm	132.6	75.6	130.6	146.8	42.7	40.2
RW-194	C	BICA	**pH**	**na**	**stnd unit**	6.62	6.56	6.81	6.91	6.93	6.48	6.73	6.74	6.81
RW-194	C	BICA	**Specific Conductance**	**na**	**µmhos/cm**	nm	nm	nm	nm	nm	nm	1,092	27,120	27,230

Table VI.B.3.b - GROUNDWATER MONITORING SYSTEM RESULTS - BICA and SITE E PROGRAMS

Alon USA LP - Big Spring Refinery

Well No.	Screen	Program	Constituent	$^{GW}GW_{Class3}$ (mg/L)	Units	CURRENT PERMIT ANALYSIS								
						Jul-19	Jan-20	Jul-20	Jan-21	Jul-21	Jan-22	Jul-22	Jan-23	Jul-23
RW-178	A	BICA	Benzene	0.5	mg/L	PSH	PSH	PSH	PSH	PSH	PSH	PSH	PSH	PSH
RW-178	A	BICA	TDS	na	mg/L	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness
RW-178	A	BICA	D. O.	na	mg/L	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet
RW-178	A	BICA	ORP	na	mV	0.93	1.63	1.45	1.35	1.32	1.25	1.20	1.13	1.11
RW-178	A	BICA	pH	na	stnd unit	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-178	A	BICA	Specific Conductance	na	µmhos/cm	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-178	A	BICA	Temperature	na	°C	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-178	A	BICA	Turbidity	na	NTU	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-179	A	BICA	Benzene	0.5	mg/L	PSH	PSH	PSH	PSH	PSH	PSH	PSH	PSH	PSH
RW-179	A	BICA	1,2-DCA	0.05	mg/L	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness
RW-179	A	BICA	Arsenic	1	mg/L	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet
RW-179	A	BICA	TDS	na	mg/L	0.42	0.35	0.32	0.02	3.23	3.06	3.66	3.48	3.44
RW-179	A	BICA	D. O.	na	mg/L	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-179	A	BICA	ORP	na	mV	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-179	A	BICA	pH	na	stnd unit	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-179	A	BICA	Specific Conductance	na	µmhos/cm	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-179	A	BICA	Temperature	na	°C	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-179	A	BICA	Turbidity	na	NTU	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-185	A	BICA	Benzene	0.05	mg/L	PSH	PSH	PSH	PSH	PSH	PSH	PSH	PSH	PSH
RW-185	A	BICA	TDS	na	mg/L	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness
RW-185	A	BICA	D. O.	na	mg/L	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet
RW-185	A	BICA	ORP	na	mV	5.78	6.06	5.13	5.26	5.16	4.92	4.91	4.81	4.81
RW-185	A	BICA	pH	na	stnd unit	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-185	A	BICA	Specific Conductance	na	µmhos/cm	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-185	A	BICA	Temperature	na	°C	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-185	A	BICA	Turbidity	na	NTU	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-192	A	BICA	Benzene	0.5	mg/L	PSH	PSH	PSH	PSH	PSH	PSH	PSH	PSH	PSH
RW-192	A	BICA	1,2-DCA	0.5	mg/L	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness
RW-192	A	BICA	Arsenic	1	mg/L	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet
RW-192	A	BICA	TDS	na	mg/L	2.51	2.42	2.46	2.39	2.42	1.98	2.39	2.30	2.30
RW-192	A	BICA	D. O.	na	mg/L	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-192	A	BICA	ORP	na	mV	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-192	A	BICA	pH	na	stnd unit	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-192	A	BICA	Specific Conductance	na	µmhos/cm	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-192	A	BICA	Temperature	na	°C	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-192	A	BICA	Turbidity	na	NTU	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-194	C	BICA	Benzene	0.5	mg/L	0.00050	0.00050	<0.00030	<0.00030	0.00072	0.00037	<0.0023	<0.00023	<0.00023
RW-194	C	BICA	1,2-DCA	0.5	mg/L	0.0179	0.0112	0.0185	0.0185	0.0169	0.0380	0.0268	0.0341	0.0341
RW-194	C	BICA	Arsenic	1	mg/L	0.0447	0.0113	<0.012	<0.012	0.0110	0.0147	0.0257	0.0153	0.0172
RW-194	C	BICA	TDS	na	mg/L	12,200	11,200	11,500	11,500	10,700	11,300	7,800	9,320	11,600
RW-194	C	BICA	D. O.	na	mg/L	2.9	3.2	1.7	1.7	2.8	3.0	3.7	4.3	3.0
RW-194	C	BICA	ORP	na	mV	(25.2)	(6.2)	(61.5)	(61.5)	(32.6)	(49.2)	(73.4)	(42.6)	(13.6)
RW-194	C	BICA	pH	na	stnd unit	7.28	7.23	6.78	6.78	6.83	6.89	6.93	7.04	7.07
RW-194	C	BICA	Specific Conductance	na	µmhos/cm	17,060	15,990	17,060	17,060	17,780	18,240	19,610	14,890	13,010

Table VI.B.3.b - GROUNDWATER MONITORING SYSTEM RESULTS - BICA and SITE E PROGRAMS

Alon USA LP - Big Spring Refinery

Well No.	Screen	Program	Constituent	$^{GW}GW_{Class3}$ (mg/L)	Units	PRE-PERMIT ANALYSIS								
						Jul-10	Jan-11	Jul-11	Jan-12	Jul-12	Jan-13	Jul-13	Jan-14	Jul-14
RW-194	C	BICA	Temperature	na	°C	31.65	21.02	Off-Line	12.02	Off-Line	21.13	22.40	19.90	22.96
RW-194	C	BICA	Turbidity	na	NTU	75.30	0.00	Off-Line	0.00	Off-Line	2.54	14.80	129.00	18.70
RW-195	C	BICA	Benzene	0.5	mg/L	0.00230	0.00170	0.00250	<0.001	Off-Line	0.00100	<0.00034	Off-Line	Off-Line
RW-195	C	BICA	1,2-DCA	0.5	mg/L	0.0052	0.0110	0.0121	0.0080	Off-Line	0.0101	0.0052	Off-Line	Off-Line
RW-195	C	BICA	Arsenic	1	mg/L	0.0098	<0.1	0.0083	0.0071	Off-Line	0.0109	0.0088	Off-Line	Off-Line
RW-195	C	BICA	TDS	na	mg/L	14,700	20,700	19,900	16,900	Off-Line	18,100	18,100	Off-Line	Off-Line
RW-195	C	BICA	D. O.	na	mg/L	nm	nm	nm	nm	Off-Line	nm	nm	Off-Line	Off-Line
RW-195	C	BICA	ORP	na	mV	nm	nm	nm	nm	Off-Line	nm	nm	Off-Line	Off-Line
RW-195	C	BICA	pH	na	stnd unit	6.67	7.67	6.91	7.25	Off-Line	6.68	6.68	Off-Line	Off-Line
RW-195	C	BICA	Specific Conductance	na	µmhos/cm	19,900	33,600	30,800	26,400	Off-Line	27,800	27,500	Off-Line	Off-Line
RW-195	C	BICA	Temperature	na	°C	32.81	22.10	25.75	18.74	Off-Line	20.64	22.76	Off-Line	Off-Line
RW-195	C	BICA	Turbidity	na	NTU	36.80	4.50	0.00	233.00	Off-Line	1.44	15.90	Off-Line	Off-Line
MW-214	A	BICA	Benzene	0.5	mg/L	0.0110	<0.001	<0.00025	<0.00025	0.0015	0.0012	0.0036	<0.00034	0.0015
MW-214	A	BICA	TDS	na	mg/L	2,680	1,010	1,080	1,060	1,060	1,140	1,230	1,210	1,240
MW-214	A	BICA	D. O.	na	mg/L	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-214	A	BICA	ORP	na	mV	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-214	A	BICA	pH	na	stnd unit	6.28	6.85	7.10	6.90	7.82	7.57	6.70	6.90	7.20
MW-214	A	BICA	Specific Conductance	na	µmhos/cm	3,000	1,000	1,530	2	1,720	1,930	1,890	190,000	1,760
MW-214	A	BICA	Temperature	na	°C	24.30	14.90	26.75	18.90	23.10	21.08	23.07	20.71	22.05
MW-214	A	BICA	Turbidity	na	NTU	9.80	0.00	0.00	7.00	0.00	5.30	0.00	0.00	4.70
MW-214A	B	BICA	Benzene	0.5	mg/L	0.0053	0.0015	0.0005	0.0005	0.0012	0.0009	0.0010	0.0004	0.0004
MW-214A	B	BICA	TDS	na	mg/L	1,580	2,570	2,180	2,240	1,750	2,120	2,350	2,160	2,210
MW-214A	B	BICA	D. O.	na	mg/L	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-214A	B	BICA	ORP	na	mV	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-214A	B	BICA	pH	na	stnd unit	7.01	7.14	6.98	6.87	8.45	7.67	6.70	6.91	6.91
MW-214A	B	BICA	Specific Conductance	na	µmhos/cm	3,790	2,000	3,260	3	2,450	3,630	3,390	3,380	2,980
MW-214A	B	BICA	Temperature	na	°C	22.30	16.00	27.46	18.37	27.78	20.97	22.99	20.38	23.56
MW-214A	B	BICA	Turbidity	na	NTU	8.30	0.00	0.00	1.79	22.30	33.30	0.00	0.00	155.00
MW-215	A	BICA	Benzene	0.5	mg/L	<0.001	0.00310	0.00110	0.00110	0.00140	0.00190	0.00610	0.00160	0.01060
MW-215	A	BICA	TDS	na	mg/L	2,120	2,220	1,850	1,780	1,850	706	1,990	1,900	1,910
MW-215	A	BICA	D. O.	na	mg/L	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-215	A	BICA	ORP	na	mV	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-215	A	BICA	pH	na	stnd unit	7.78	7.34	7.23	6.86	7.66	7.77	7.45	6.89	7.04
MW-215	A	BICA	Specific Conductance	na	µmhos/cm	2,100	2,430	3,010	3	3	2,830	2,740	2,850	2,530
MW-215	A	BICA	Temperature	na	°C	23.57	19.30	31.59	20.74	22.38	20.90	20.84	20.76	21.99
MW-215	A	BICA	Turbidity	na	NTU	0.00	0.00	0.00	0.00	0.00	0.60	14.40	0.00	106.00
MW-215A	B	BICA	Benzene	0.5	mg/L	<0.001	0.00170	<0.00025	<0.00025	<0.00025	<0.00034	0.00450	<0.00034	<0.00034
MW-215A	B	BICA	TDS	na	mg/L	2,970	2,620	2,070	2,040	2,070	2,040	2,180	2,120	2,110
MW-215A	B	BICA	D. O.	na	mg/L	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-215A	B	BICA	ORP	na	mV	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-215A	B	BICA	pH	na	stnd unit	8.23	7.14	6.92	6.73	7.45	5.32	7.52	6.85	6.94
MW-215A	B	BICA	Specific Conductance	na	µmhos/cm	3,000	3,220	3,180	3	2,680	3,260	3,140	3,210	2,810
MW-215A	B	BICA	Temperature	na	°C	22.84	18.50	28.64	20.81	22.16	21.67	21.90	19.48	22.07

Table VI.B.3.b - GROUNDWATER MONITORING SYSTEM RESULTS - BICA and SITE E PROGRAMS

Alon USA LP - Big Spring Refinery

Well No.	Screen	Program	Constituent	$^{GW}GW_{Class3}$ (mg/L)	Units	CURRENT PERMIT ANALYSIS								
						Mar-15	Jul-15	Jan-16	Jul-16	Jan-17	Jul-17	Jan-18	Jul-18	Jan-19
RW-194	C	BICA	Temperature	na	°C	nm	nm	nm	nm	nm	nm	20.60	24.90	21.20
RW-194	C	BICA	Turbidity	na	NTU	nm	nm	nm	nm	nm	nm	3.20	2.90	2.20
RW-195	C	BICA	Benzene	0.5	mg/L	<0.00034	<0.00034	0.00072	0.01770	0.01720	0.00990	0.00850	0.02250	0.00300
RW-195	C	BICA	1,2-DCA	0.5	mg/L	<0.00035	0.0088	0.0073	0.0089	0.0084	0.0074	0.0084	0.0098	0.0153
RW-195	C	BICA	Arsenic	1	mg/L	0.0100	0.0089	0.0048	<0.00047	0.0007	0.0006	0.0005	0.0156	0.0164
RW-195	C	BICA	TDS	na	mg/L	3,410	19,900	10,000	18,400	12,000	11,400	11,600	13,800	10,600
RW-195	C	BICA	D. O.	na	mg/L	1.8	1.0	3.3	5.7	2.9	6.2	5.6	1.5	1.9
RW-195	C	BICA	ORP	na	mV	nm	nm	nm	(55.4)	135.8	178.6	139.4	44.7	74.6
RW-195	C	BICA	pH	na	stnd unit	6.48	7.36	6.41	6.21	7.91	6.49	6.91	6.86	6.91
RW-195	C	BICA	Specific Conductance	na	µmhos/cm	nm	nm	nm	nm	nm	nm	1,118	25,020	24,610
RW-195	C	BICA	Temperature	na	°C	nm	nm	nm	nm	nm	nm	20.40	25.40	21.00
RW-195	C	BICA	Turbidity	na	NTU	nm	nm	nm	nm	nm	nm	3.10	2.70	1.90
MW-214	A	BICA	Benzene	0.5	mg/L	<0.00034	<0.00034	<0.00047	<0.00047	<0.00047	<0.0003	<0.0003	<0.0004	<0.0004
MW-214	A	BICA	TDS	na	mg/L	1,230	1,270	1,190	1,230	1,250	1,270	1,170	1,380	1,310
MW-214	A	BICA	D. O.	na	mg/L	1.9	2.4	2.6	2.7	2.7	2.2	2.2	2.1	2.1
MW-214	A	BICA	ORP	na	mV	nm	nm	nm	48.2	48.9	(37.5)	(26.1)	(61.5)	(58.5)
MW-214	A	BICA	pH	na	stnd unit	7.05	6.95	6.99	7.02	7.18	7.05	7.06	6.91	6.91
MW-214	A	BICA	Specific Conductance	na	µmhos/cm	nm	nm	nm	nm	nm	nm	1,688	1,735	1,795
MW-214	A	BICA	Temperature	na	°C	nm	nm	nm	nm	nm	nm	21.00	22.60	20.10
MW-214	A	BICA	Turbidity	na	NTU	nm	nm	nm	nm	nm	nm	7.30	7.90	7.30
MW-214A	B	BICA	Benzene	0.5	mg/L	0.0013	<0.00034	0.0021	<0.00047	<0.00047	0.0027	<0.0003	0.0016	<0.0004
MW-214A	B	BICA	TDS	na	mg/L	2,080	2,090	2,160	2,120	2,480	2,270	2,430	2,330	2,070
MW-214A	B	BICA	D. O.	na	mg/L	1.2	0.8	1.1	1.3	1.4	1.6	1.6	1.6	1.7
MW-214A	B	BICA	ORP	na	mV	nm	nm	nm	(96.8)	(72.8)	(131.5)	(122.6)	(78.3)	(59.3)
MW-214A	B	BICA	pH	na	stnd unit	7.04	6.95	7.01	6.92	7.01	7.02	7.07	6.78	6.80
MW-214A	B	BICA	Specific Conductance	na	µmhos/cm	nm	nm	nm	nm	nm	nm	3,080	3,200	3,030
MW-214A	B	BICA	Temperature	na	°C	nm	nm	nm	nm	nm	nm	21.10	22.50	20.30
MW-214A	B	BICA	Turbidity	na	NTU	nm	nm	nm	nm	nm	nm	7.00	6.90	6.30
MW-215	A	BICA	Benzene	0.5	mg/L	0.00490	0.00190	0.00250	0.00210	0.00310	0.00240	0.00100	0.00140	0.00071
MW-215	A	BICA	TDS	na	mg/L	1,770	1,950	1,960	2,100	2,100	2,230	2,300	2,470	2,460
MW-215	A	BICA	D. O.	na	mg/L	1.1	6.1	3.8	3.3	3.4	2.6	2.5	2.2	2.2
MW-215	A	BICA	ORP	na	mV	nm	nm	nm	18.1	72.1	97.9	45.6	78.7	68.8
MW-215	A	BICA	pH	na	stnd unit	7.07	6.74	7.15	6.56	6.44	5.71	6.33	6.97	6.98
MW-215	A	BICA	Specific Conductance	na	µmhos/cm	nm	nm	nm	nm	nm	nm	2,670	3,170	3,070
MW-215	A	BICA	Temperature	na	°C	nm	nm	nm	nm	nm	nm	20.10	24.50	20.00
MW-215	A	BICA	Turbidity	na	NTU	nm	nm	nm	nm	nm	nm	1.90	4.80	3.90
MW-215A	B	BICA	Benzene	0.5	mg/L	0.00120	<0.00034	<0.00047	<0.00047	0.00066	<0.0003	<0.0003	<0.0004	<0.0004
MW-215A	B	BICA	TDS	na	mg/L	1,950	1,930	1,920	2,030	2,060	2,070	1,930	1,850	1,820
MW-215A	B	BICA	D. O.	na	mg/L	0.9	3.9	3.0	2.5	2.3	1.8	2.0	2.0	2.2
MW-215A	B	BICA	ORP	na	mV	nm	nm	nm	(68.6)	(62.8)	(21.0)	(77.9)	65.9	61.5
MW-215A	B	BICA	pH	na	stnd unit	6.99	6.86	7.05	6.76	6.64	6.25	6.31	6.94	7.02
MW-215A	B	BICA	Specific Conductance	na	µmhos/cm	nm	nm	nm	nm	nm	nm	2,260	2,640	2,430
MW-215A	B	BICA	Temperature	na	°C	nm	nm	nm	nm	nm	nm	20.10	23.60	20.40

Table VI.B.3.b - GROUNDWATER MONITORING SYSTEM RESULTS - BICA and SITE E PROGRAMS

Alon USA LP - Big Spring Refinery

Well No.	Screen	Program	Constituent	$^{GW}GW_{Class3}$ (mg/L)	Units	CURRENT PERMIT ANALYSIS								
						Jul-19	Jan-20	Jul-20	Jan-21	Jul-21	Jan-22	Jul-22	Jan-23	Jul-23
RW-194	C	BICA	Temperature	na	°C	23.3	21.7	23.6	23.6	19.6	21.3	21.8	19.3	23.1
RW-194	C	BICA	Turbidity	na	NTU	2.90	2.10	1.40	1.40	1.90	1.30	1.70	1.90	1.70
RW-195	C	BICA	Benzene	0.5	mg/L	0.00072	0.00048	0.00190	0.00190	0.00099	0.00099	<0.00023	<0.00023	<0.00023
RW-195	C	BICA	1,2-DCA	0.5	mg/L	0.0163	0.0129	0.0212	0.0212	0.0173	0.0088	0.0044	0.0016	0.0028
RW-195	C	BICA	Arsenic	1	mg/L	0.0152	0.0079	<0.012	<0.012	0.0144	0.0112	0.0146	0.0087	0.0084
RW-195	C	BICA	TDS	na	mg/L	12,100	11,000	13,800	13,800	11,600	9,900	6,740	5,410	8,900
RW-195	C	BICA	D. O.	na	mg/L	3.7	3.2	2.0	2.0	2.1	3.9	4.2	1.7	1.2
RW-195	C	BICA	ORP	na	mV	(43.6)	22.8	(42.5)	(42.5)	(46.2)	(89.4)	(94.8)	79.4	20.8
RW-195	C	BICA	pH	na	stnd unit	6.93	6.98	6.90	6.90	6.90	6.98	7.01	6.78	6.96
RW-195	C	BICA	Specific Conductance	na	µmhos/cm	16,950	14,790	19,710	19,710	19,200	18,210	19,110	9,220	9,190
RW-195	C	BICA	Temperature	na	°C	29.5	17.8	22.1	22.1	20.4	21.6	21.9	16.6	24.6
RW-195	C	BICA	Turbidity	na	NTU	1.60	1.90	1.80	1.80	2.60	2.10	1.70	1.00	2.20
MW-214	A	BICA	Benzene	0.5	mg/L	<0.0004	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	0.00031	<0.00023	0.00053
MW-214	A	BICA	TDS	na	mg/L	1,570	1,330	1,480	1,480	1,360	1,550	1,380	1,560	1,650
MW-214	A	BICA	D. O.	na	mg/L	2.0	1.9	2.0	2.0	1.3	1.8	1.7	1.2	1.7
MW-214	A	BICA	ORP	na	mV	(49.3)	(43.1)	(53.2)	(53.2)	30.5	68.9	29.1	(6.0)	53.6
MW-214	A	BICA	pH	na	stnd unit	6.89	6.87	6.89	6.89	6.90	7.04	7.05	6.97	6.82
MW-214	A	BICA	Specific Conductance	na	µmhos/cm	1,827	1,857	2,140	2,140	1,910	1,515	1,910	2,340	2,610
MW-214	A	BICA	Temperature	na	°C	23.6	20.6	21.3	21.3	20.5	22.9	22.8	18.6	24.8
MW-214	A	BICA	Turbidity	na	NTU	8.00	7.10	4.60	4.60	3.70	5.90	5.40	5.10	3.80
MW-214A	B	BICA	Benzene	0.5	mg/L	0.00052	0.00044	<0.0003	<0.0003	<0.0003	0.00052	<0.00023	<0.00023	<0.00023
MW-214A	B	BICA	TDS	na	mg/L	2,320	1,780	1,970	1,970	1,880	1,880	1,950	1,910	2,260
MW-214A	B	BICA	D. O.	na	mg/L	1.5	1.7	1.6	1.6	1.3	1.3	1.3	0.4	1.3
MW-214A	B	BICA	ORP	na	mV	(52.8)	(119.1)	(121.5)	(121.5)	(97.3)	(94.4)	(25.9)	(73.2)	(49.2)
MW-214A	B	BICA	pH	na	stnd unit	6.93	7.04	6.96	6.96	7.15	7.12	7.17	7.10	6.84
MW-214A	B	BICA	Specific Conductance	na	µmhos/cm	2,870	2,830	3,620	3,620	3,350	2,230	2,570	3,050	3,810
MW-214A	B	BICA	Temperature	na	°C	23.2	20.4	21.5	21.5	20.4	22.0	22.5	18.6	26.2
MW-214A	B	BICA	Turbidity	na	NTU	6.30	6.00	6.50	6.50	6.60	5.80	5.80	4.40	4.10
MW-215	A	BICA	Benzene	0.5	mg/L	0.00064	0.00070	<0.0003	<0.0003	<0.0003	<0.0003	<0.00023	<0.00023	<0.00023
MW-215	A	BICA	TDS	na	mg/L	2,510	2,060	2,650	2,650	2,830	2,590	2,710	2,860	4,180
MW-215	A	BICA	D. O.	na	mg/L	1.8	2.1	1.8	1.8	7.8	1.4	1.3	0.9	1.9
MW-215	A	BICA	ORP	na	mV	65.1	51.2	(142.8)	(142.8)	(36.1)	(33.4)	6.1	(68.9)	(66.2)
MW-215	A	BICA	pH	na	stnd unit	7.11	7.05	7.08	7.08	6.86	7.41	7.18	7.04	7.22
MW-215	A	BICA	Specific Conductance	na	µmhos/cm	3,210	2,930	3,610	3,610	2,890	2,900	3,420	3,920	3,480
MW-215	A	BICA	Temperature	na	°C	22.9	21.2	22.0	22.0	20.2	22.7	24.1	19.0	27.3
MW-215	A	BICA	Turbidity	na	NTU	6.10	7.50	5.90	5.90	3.20	4.80	4.90	7.40	4.70
MW-215A	B	BICA	Benzene	0.5	mg/L	<0.0004	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.00023	<0.00023	<0.00023
MW-215A	B	BICA	TDS	na	mg/L	1,760	1,650	1,840	1,840	1,870	1,680	1,720	1,870	1,740
MW-215A	B	BICA	D. O.	na	mg/L	2.5	1.8	2.6	2.6	2.2	1.2	1.1	0.4	1.9
MW-215A	B	BICA	ORP	na	mV	39.5	92.9	(46.9)	(46.9)	7.6	11.9	52.2	16.1	17.6
MW-215A	B	BICA	pH	na	stnd unit	7.03	7.09	6.88	6.88	6.82	7.48	7.11	6.95	7.70
MW-215A	B	BICA	Specific Conductance	na	µmhos/cm	2,400	2,270	2,600	2,600	2,190	1,791	2,080	2,530	1,619
MW-215A	B	BICA	Temperature	na	°C	22.8	21.4	21.0	21.0	19.5	23.4	25.9	19.0	21.5

Table VI.B.3.b - GROUNDWATER MONITORING SYSTEM RESULTS - BICA and SITE E PROGRAMS

Alon USA LP - Big Spring Refinery

Well No.	Screen	Program	Constituent	$^{GW}GW_{Class3}$ (mg/L)	Units	PRE-PERMIT ANALYSIS								
						Jul-10	Jan-11	Jul-11	Jan-12	Jul-12	Jan-13	Jul-13	Jan-14	Jul-14
MW-215A	B	BICA	Turbidity	na	NTU	1.90	0.00	0.00	0.10	0.90	0.50	0.00	0.00	0.00
MW-218	A	BICA	Benzene	0.5	mg/L	<0.001	<0.001	0.00063	<0.001	0.00083	0.00042	0.00420	0.00081	0.00100
MW-218	A	BICA	TDS	na	mg/L	3,130	2,980	2,600	2,580	2,550	2,790	2,850	2,880	3,000
MW-218	A	BICA	D. O.	na	mg/L	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-218	A	BICA	ORP	na	mV	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-218	A	BICA	pH	na	stnd unit	6.89	7.00	6.94	6.61	7.31	6.47	6.92	6.69	6.63
MW-218	A	BICA	Specific Conductance	na	µmhos/cm	4,540	900	3,740	4	2,580	4,310	4,230	4,410	3,950
MW-218	A	BICA	Temperature	na	°C	24.71	19.00	26.79	20.13	22.16	20.48	20.73	20.80	22.82
MW-218	A	BICA	Turbidity	na	NTU	97.40	0.00	0.00	0.00	3.00	0.00	0.00	0.00	0.00
MW-218A	B	BICA	Benzene	0.5	mg/L	0.0130	0.0480	0.0285	0.0308	0.0558	0.0483	0.0819	<Pump	0.0528
MW-218A	B	BICA	TDS	na	mg/L	10,300	25,400	18,600	12,400	18,000	15,700	18,200	<Pump	18,500
MW-218A	B	BICA	D. O.	na	mg/L	nm	nm	nm	nm	nm	nm	nm	<Pump	nm
MW-218A	B	BICA	ORP	na	mV	nm	nm	nm	nm	nm	nm	nm	<Pump	nm
MW-218A	B	BICA	pH	na	stnd unit	5.31	6.75	6.67	6.62	7.26	6.49	6.69	<Pump	5.99
MW-218A	B	BICA	Specific Conductance	na	µmhos/cm	5,000	2,990	25,600	20,000	4,190	23,400	27,600	<Pump	23,500
MW-218A	B	BICA	Temperature	na	°C	26.78	21.70	25.60	20.89	21.92	20.40	20.78	<Pump	24.66
MW-218A	B	BICA	Turbidity	na	NTU	0.00	0.00	0.00	3.90	0.00	164.00	1.10	<Pump	49.20
MW-220	A	BICA	Benzene	0.5	mg/L	<0.001	<0.001	DRY	DRY	DRY	DRY	<0.00034	DRY	<0.00034
MW-220	A	BICA	TDS	na	mg/L	734	789	DRY	DRY	DRY	DRY	818	DRY	838
MW-220	A	BICA	D. O.	na	mg/L	nm	nm	DRY	DRY	DRY	DRY	nm	DRY	nm
MW-220	A	BICA	ORP	na	mV	nm	nm	DRY	DRY	DRY	DRY	nm	DRY	nm
MW-220	A	BICA	pH	na	stnd unit	4.98	7.47	DRY	DRY	DRY	DRY	6.72	DRY	6.99
MW-220	A	BICA	Specific Conductance	na	µmhos/cm	1,000	900	DRY	DRY	DRY	DRY	1,170	DRY	1,020
MW-220	A	BICA	Temperature	na	°C	28.20	16.90	DRY	DRY	DRY	DRY	25.41	DRY	23.80
MW-220	A	BICA	Turbidity	na	NTU	427.00	0.00	DRY	DRY	DRY	DRY	0.00	DRY	0.00
MW-220A	B	BICA	Benzene	0.5	mg/L	<0.001	<0.001	<0.00025	<0.00025	0.00200	<0.00034	<0.00034	<0.00034	<0.00034
MW-220A	B	BICA	TDS	na	mg/L	2,670	2,020	1,740	1,690	1,750	1,780	1,780	1,830	1,700
MW-220A	B	BICA	D. O.	na	mg/L	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-220A	B	BICA	ORP	na	mV	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-220A	B	BICA	pH	na	stnd unit	6.85	7.65	nm	8.46	8.48	5.73	7.61	7.50	7.60
MW-220A	B	BICA	Specific Conductance	na	µmhos/cm	3,000	3,920	nm	3,100	2	2,560	1,790	3,330	1,110
MW-220A	B	BICA	Temperature	na	°C	23.90	16.60	nm	21.11	23.09	22.52	22.67	20.79	22.82
MW-220A	B	BICA	Turbidity	na	NTU	0.20	0.00	nm	0.00	448.00	4.80	81.30	460.00	52.50
MW-221	A	BICA	Benzene	0.5	mg/L	0.0046	0.0015	0.0015	PSH	0.0007	PSH	PSH	PSH	PSH
MW-221	A	BICA	1,2-DCA	0.5	mg/L	<0.001	<0.005	<0.0002	Thickness	<0.00020	Thickness	Thickness	Thickness	Thickness
MW-221	A	BICA	Arsenic	1	mg/L	<0.005	<0.1	0.0032	In Feet	0.0039	In Feet	In Feet	In Feet	In Feet
MW-221	A	BICA	TDS	na	mg/L	1770	1290	1100	3.04	1120	2.97	3.08	0.01	Emulsion
MW-221	A	BICA	D. O.	na	mg/L	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-221	A	BICA	ORP	na	mV	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-221	A	BICA	pH	na	stnd unit	6.46	7.40	7.31	nm	7.02	nm	nm	nm	nm
MW-221	A	BICA	Specific Conductance	na	µmhos/cm	500	1,890	1,790	nm	1,820	nm	nm	nm	nm
MW-221	A	BICA	Temperature	na	°C	24.90	21.17	24.53	nm	22.30	nm	nm	nm	nm
MW-221	A	BICA	Turbidity	na	NTU	15.50	4.50	2.70	nm	0.00	nm	nm	nm	nm

Table VI.B.3.b - GROUNDWATER MONITORING SYSTEM RESULTS - BICA and SITE E PROGRAMS

Alon USA LP - Big Spring Refinery

Well No.	Screen	Program	Constituent	$^{GW}GW_{Class3}$ (mg/L)	Units	CURRENT PERMIT ANALYSIS								
						Mar-15	Jul-15	Jan-16	Jul-16	Jan-17	Jul-17	Jan-18	Jul-18	Jan-19
MW-215A	B	BICA	Turbidity	na	NTU	nm	nm	nm	nm	nm	nm	1.00	4.30	4.10
MW-218	A	BICA	Benzene	0.5	mg/L	0.00360	0.00068	0.00370	0.00071	0.00140	0.00120	0.00067	0.00082	0.00041
MW-218	A	BICA	TDS	na	mg/L	3,040	3,080	3,000	3,390	3,360	3,490	3,610	3,990	3,070
MW-218	A	BICA	D. O.	na	mg/L	0.9	3.5	1.6	1.5	1.6	1.6	1.7	1.5	1.5
MW-218	A	BICA	ORP	na	mV	nm	nm	nm	12.9	64.5	47.9	104.9	88.7	88.0
MW-218	A	BICA	pH	na	stnd unit	6.78	6.67	6.85	6.74	6.84	6.52	6.85	6.85	6.85
MW-218	A	BICA	Specific Conductance	na	µmhos/cm	nm	nm	nm	nm	nm	nm	3,980	4,860	4,780
MW-218	A	BICA	Temperature	na	°C	nm	nm	nm	nm	nm	nm	21.60	23.60	21.00
MW-218	A	BICA	Turbidity	na	NTU	nm	nm	nm	nm	nm	nm	2.30	4.30	3.00
MW-218A	B	BICA	Benzene	0.5	mg/L	0.0556	0.0024	0.0095	0.0098	0.0185	0.0908	0.0073	0.0949	0.0908
MW-218A	B	BICA	TDS	na	mg/L	16,100	5,370	7,620	8,660	9,220	11,800	7,710	11,000	10,600
MW-218A	B	BICA	D. O.	na	mg/L	0.7	3.5	2.6	2.1	2.3	1.7	1.7	1.6	1.7
MW-218A	B	BICA	ORP	na	mV	nm	nm	nm	17.3	51.9	(14.8)	(37.8)	(73.9)	(67.1)
MW-218A	B	BICA	pH	na	stnd unit	6.72	6.77	6.92	6.89	6.86	6.62	6.95	6.97	6.86
MW-218A	B	BICA	Specific Conductance	na	µmhos/cm	nm	nm	nm	nm	nm	nm	7,230	6,940	6,330
MW-218A	B	BICA	Temperature	na	°C	nm	nm	nm	nm	nm	nm	22.10	24.10	20.50
MW-218A	B	BICA	Turbidity	na	NTU	nm	nm	nm	nm	nm	nm	5.40	7.10	5.80
MW-220	A	BICA	Benzene	0.5	mg/L	0.0028	<0.00034	<0.00047	<0.00047	<0.00047	<0.0003	<0.0003	<0.0004	<0.0004
MW-220	A	BICA	TDS	na	mg/L	654	656	607	552	667	621	579	586	546
MW-220	A	BICA	D. O.	na	mg/L	3.6	5.3	5.1	4.7	4.5	4.4	4.6	4.5	4.6
MW-220	A	BICA	ORP	na	mV	nm	nm	nm	85.7	85.4	17.3	34.5	58.3	52.8
MW-220	A	BICA	pH	na	stnd unit	6.85	6.97	6.77	6.86	6.98	7.00	6.88	6.92	6.96
MW-220	A	BICA	Specific Conductance	na	µmhos/cm	nm	nm	nm	nm	nm	nm	1,138	1,127	1,075
MW-220	A	BICA	Temperature	na	°C	nm	nm	nm	nm	nm	nm	21.00	24.00	21.00
MW-220	A	BICA	Turbidity	na	NTU	nm	nm	nm	nm	nm	nm	8.00	8.60	8.60
MW-220A	B	BICA	Benzene	0.5	mg/L	ns	<0.00034	<0.00047	<0.00047	<0.00047	0.00037	<0.0003	<0.0004	<0.0004
MW-220A	B	BICA	TDS	na	mg/L	ns	1,780	1,600	1,750	1,720	1,590	1,760	1,620	1,540
MW-220A	B	BICA	D. O.	na	mg/L	nm	0.5	0.6	1.4	1.5	1.4	1.5	1.9	2.0
MW-220A	B	BICA	ORP	na	mV	nm	nm	nm	(57.3)	(43.4)	(62.5)	(63.8)	(96.7)	(91.5)
MW-220A	B	BICA	pH	na	stnd unit	nm	6.94	6.86	6.84	6.60	6.93	6.91	6.97	6.96
MW-220A	B	BICA	Specific Conductance	na	µmhos/cm	nm	nm	nm	nm	nm	nm	1,848	2,180	2,180
MW-220A	B	BICA	Temperature	na	°C	nm	nm	nm	nm	nm	nm	20.70	24.80	21.00
MW-220A	B	BICA	Turbidity	na	NTU	nm	nm	nm	nm	nm	nm	69.20	58.20	37.30
MW-221	A	BICA	Benzene	0.5	mg/L	PSH	PSH	PSH	PSH	PSH	PSH	PSH	PSH	PSH
MW-221	A	BICA	1,2-DCA	0.5	mg/L	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness
MW-221	A	BICA	Arsenic	1	mg/L	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet
MW-221	A	BICA	TDS	na	mg/L	2.60	2.50	1.91	1.22	0.87	0.26	0.03	0.65	0.01
MW-221	A	BICA	D. O.	na	mg/L	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-221	A	BICA	ORP	na	mV	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-221	A	BICA	pH	na	stnd unit	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-221	A	BICA	Specific Conductance	na	µmhos/cm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-221	A	BICA	Temperature	na	°C	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-221	A	BICA	Turbidity	na	NTU	nm	nm	nm	nm	nm	nm	nm	nm	nm

Table VI.B.3.b - GROUNDWATER MONITORING SYSTEM RESULTS - BICA and SITE E PROGRAMS

Alon USA LP - Big Spring Refinery

Well No.	Screen	Program	Constituent	$^{GW}GW_{Class3}$ (mg/L)	Units	CURRENT PERMIT ANALYSIS								
						Jul-19	Jan-20	Jul-20	Jan-21	Jul-21	Jan-22	Jul-22	Jan-23	Jul-23
MW-215A	B	BICA	Turbidity	na	NTU	4.90	5.90	5.90	5.90	10.20	9.80	10.30	3.70	3.20
MW-218	A	BICA	Benzene	0.5	mg/L	<0.0004	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.00023	<0.00023	<0.00023
MW-218	A	BICA	TDS	na	mg/L	704	1,720	649	649	868	475	418	616	768
MW-218	A	BICA	D. O.	na	mg/L	1.7	1.7	1.6	1.6	3.0	4.3	3.3	2.1	1.9
MW-218	A	BICA	ORP	na	mV	83.8	42.2	27.7	27.7	8.1	32.8	9.0	21.1	(126.3)
MW-218	A	BICA	pH	na	stnd unit	6.85	7.02	7.05	7.05	7.02	7.72	7.29	7.21	7.17
MW-218	A	BICA	Specific Conductance	na	µmhos/cm	4,670	3,940	4,560	4,560	2,670	860	805	1,149	1,580
MW-218	A	BICA	Temperature	na	°C	22.6	21.8	22.0	22.0	21.8	22.5	23.3	18.3	26.6
MW-218	A	BICA	Turbidity	na	NTU	3.70	5.00	5.70	5.70	6.20	4.40	4.20	4.50	2.90
MW-218A	B	BICA	Benzene	0.5	mg/L	0.1080	0.1230	0.1710	0.1710	0.2520	0.2390	0.04430	0.00450	0.00045
MW-218A	B	BICA	TDS	na	mg/L	11,800	9,120	10,700	10,700	12,400	10,600	10,400	7,730	5,740
MW-218A	B	BICA	D. O.	na	mg/L	1.9	1.8	1.9	1.9	1.7	1.3	1.2	0.2	0.9
MW-218A	B	BICA	ORP	na	mV	(70.2)	(70.8)	(45.2)	(45.2)	(85.5)	(15.2)	(5.4)	(6.9)	9.2
MW-218A	B	BICA	pH	na	stnd unit	6.90	6.99	6.73	6.73	6.81	7.24	6.94	6.75	6.14
MW-218A	B	BICA	Specific Conductance	na	µmhos/cm	5,940	5,690	6,790	6,790	6,980	5,600	6,580	10,710	12,120
MW-218A	B	BICA	Temperature	na	°C	23.5	21.1	21.6	21.6	19.8	23.3	23.4	17.2	23.6
MW-218A	B	BICA	Turbidity	na	NTU	3.50	5.00	6.00	6.00	7.10	5.50	4.70	3.90	3.00
MW-220	A	BICA	Benzene	0.5	mg/L	<0.0004	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.00023	<0.00023	<0.00023
MW-220	A	BICA	TDS	na	mg/L	572	488	532	532	530	688	946	838	1,330
MW-220	A	BICA	D. O.	na	mg/L	4.6	4.5	4.7	4.7	8.5	5.1	4.9	5.0	6.0
MW-220	A	BICA	ORP	na	mV	57.0	107.3	89.3	89.3	101.7	79.7	124.6	125.9	100.2
MW-220	A	BICA	pH	na	stnd unit	7.01	7.02	6.92	6.92	7.04	6.76	6.83	7.08	6.86
MW-220	A	BICA	Specific Conductance	na	µmhos/cm	925	700	891	891	665	678	798	1,336	1,704
MW-220	A	BICA	Temperature	na	°C	23.7	22.3	21.7	21.7	19.9	23.3	24.8	19.6	25.0
MW-220	A	BICA	Turbidity	na	NTU	8.90	9.30	7.30	7.30	3.10	6.20	6.10	6.30	7.30
MW-220A	B	BICA	Benzene	0.5	mg/L	<0.0004	0.00071	<0.0003	<0.0003	<0.0003	<0.0003	<0.00023	<0.00023	<0.00023
MW-220A	B	BICA	TDS	na	mg/L	1,540	1,540	1,800	1,800	1,670	1,420	844	1,150	1,460
MW-220A	B	BICA	D. O.	na	mg/L	2.0	2.4	2.1	2.1	4.1	3.1	2.8	1.0	1.4
MW-220A	B	BICA	ORP	na	mV	(65.8)	(76.9)	(93.8)	(93.8)	(22.0)	(131.2)	(15.4)	32.0	(63.2)
MW-220A	B	BICA	pH	na	stnd unit	7.03	7.00	6.83	6.83	6.85	6.67	6.78	6.89	6.73
MW-220A	B	BICA	Specific Conductance	na	µmhos/cm	2,190	1,821	2,240	2,240	1,760	1,644	1,657	2,030	1,908
MW-220A	B	BICA	Temperature	na	°C	24.1	22.5	21.2	21.2	19.7	24.0	25.1	19.4	25.4
MW-220A	B	BICA	Turbidity	na	NTU	46.20	36.30	43.80	43.80	16.10	11.50	8.40	9.00	8.70
MW-221	A	BICA	Benzene	0.5	mg/L	PSH	PSH	PSH	PSH	PSH	PSH	PSH	PSH	PSH
MW-221	A	BICA	1,2-DCA	0.5	mg/L	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness
MW-221	A	BICA	Arsenic	1	mg/L	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet
MW-221	A	BICA	TDS	na	mg/L	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.03	0.02
MW-221	A	BICA	D. O.	na	mg/L	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-221	A	BICA	ORP	na	mV	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-221	A	BICA	pH	na	stnd unit	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-221	A	BICA	Specific Conductance	na	µmhos/cm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-221	A	BICA	Temperature	na	°C	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-221	A	BICA	Turbidity	na	NTU	nm	nm	nm	nm	nm	nm	nm	nm	nm

Table VI.B.3.b - GROUNDWATER MONITORING SYSTEM RESULTS - BICA and SITE E PROGRAMS

Alon USA LP - Big Spring Refinery

Well No.	Screen	Program	Constituent	$^{GW}GW_{Class3}$ (mg/L)	Units	PRE-PERMIT ANALYSIS								
						Jul-10	Jan-11	Jul-11	Jan-12	Jul-12	Jan-13	Jul-13	Jan-14	Jul-14
MW-221A	B	BICA	Benzene	0.5	mg/L	<0.001	<0.001	0.00049	0.00045	0.00026	0.00047	<0.00034	0.00034	<0.00034
MW-221A	B	BICA	TDS	na	mg/L	1,220	1,060	955	862	922	955	1,090	980	997
MW-221A	B	BICA	D. O.	na	mg/L	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-221A	B	BICA	ORP	na	mV	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-221A	B	BICA	pH	na	stnd unit	7.25	6.05	8.34	7.18	7.70	7.81	7.95	6.96	7.09
MW-221A	B	BICA	Specific Conductance	na	µmhos/cm	1,200	1,560	1,480	2	1,440	1,520	1,410	1,470	1,300
MW-221A	B	BICA	Temperature	na	°C	22.80	22.20	23.41	20.96	22.78	21.48	22.95	20.57	24.13
MW-221A	B	BICA	Turbidity	na	NTU	162.00	1.20	14.50	0.20	0.00	1.20	13.20	97.80	0.00
MW-223	A	BICA	Benzene	0.5	mg/L	0.0011	<0.001	<0.00025	<0.00025	<0.00025	<0.00034	<0.00034	<0.00034	<0.00034
MW-223	A	BICA	TDS	na	mg/L	2,160	1,620	1,640	1,540	1,600	1,480	1,600	1,560	1,620
MW-223	A	BICA	D. O.	na	mg/L	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-223	A	BICA	ORP	na	mV	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-223	A	BICA	pH	na	stnd unit	6.90	7.72	8.25	8.01	8.31	8.11	8.49	6.85	7.17
MW-223	A	BICA	Specific Conductance	na	µmhos/cm	2,720	900	2,570	3	2,400	2,670	1,250	2,520	1,980
MW-223	A	BICA	Temperature	na	°C	27.59	21.18	24.07	19.20	21.99	20.25	21.81	20.49	23.15
MW-223	A	BICA	Turbidity	na	NTU	6.11	1.34	1.20	35.60	10.40	15.50	7.90	0.00	17.90
MW-223A	B	BICA	Benzene	0.5	mg/L	<0.001	<0.001	<0.00025	<0.00025	<0.00025	<0.00034	<0.00034	<0.00034	<0.00034
MW-223A	B	BICA	TDS	na	mg/L	3,240	2,260	2,190	1,840	2,000	2,120	2,170	2,040	2,260
MW-223A	B	BICA	D. O.	na	mg/L	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-223A	B	BICA	ORP	na	mV	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-223A	B	BICA	pH	na	stnd unit	6.86	6.48	8.02	6.95	7.25	7.33	7.75	6.65	6.81
MW-223A	B	BICA	Specific Conductance	na	µmhos/cm	3,340	3,880	2,740	4	3,170	3,490	3,120	3,250	2,860
MW-223A	B	BICA	Temperature	na	°C	51.30	21.13	23.12	20.13	22.07	19.75	21.28	20.55	22.11
MW-223A	B	BICA	Turbidity	na	NTU	24.20	0.19	27.40	0.00	13.40	16.00	27.10	0.00	0.00
MW-224	A	BICA	Benzene	0.5	mg/L	<0.001	<0.001	<0.00025	0.0003	<0.00025	0.0004	<0.00034	<0.00034	<0.00034
MW-224	A	BICA	TDS	na	mg/L	3,390	2,330	1,860	1,410	1,850	2,010	1,980	1,810	1,780
MW-224	A	BICA	D. O.	na	mg/L	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-224	A	BICA	ORP	na	mV	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-224	A	BICA	pH	na	stnd unit	7.83	6.24	7.31	6.82	7.15	7.22	7.55	6.62	7.09
MW-224	A	BICA	Specific Conductance	na	µmhos/cm	3,026	3,090	2,930	3	2,850	3,030	3	2,720	2,280
MW-224	A	BICA	Temperature	na	°C	22.45	21.97	30.07	20.66	22.93	20.85	21.59	20.64	22.49
MW-224	A	BICA	Turbidity	na	NTU	2.37	1.89	9.10	0.00	8.30	1.20	15.50	0.00	0.00
MW-224A	B	BICA	Benzene	0.5	mg/L	<0.001	<0.001	<0.00025	<0.00025	<0.00025	0.0006	<0.00034	<0.00034	<0.00034
MW-224A	B	BICA	TDS	na	mg/L	2,010	1,840	2,050	1,820	1,450	1,870	1,840	1,650	1,660
MW-224A	B	BICA	D. O.	na	mg/L	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-224A	B	BICA	ORP	na	mV	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-224A	B	BICA	pH	na	stnd unit	7.64	6.60	8.05	7.07	7.44	5.70	7.81	6.82	7.29
MW-224A	B	BICA	Specific Conductance	na	µmhos/cm	2,169	2,710	2,510	3	2,400	2,690	2,360	2,380	1,990
MW-224A	B	BICA	Temperature	na	°C	27.64	20.79	24.25	20.87	22.58	21.88	21.66	20.73	23.28
MW-224A	B	BICA	Turbidity	na	NTU	3.05	0.21	18.50	0.30	0.00	0.70	1.40	0.00	0.00
MW-225	A	BICA	Benzene	0.5	mg/L	<0.001	<0.001	<0.00025	0.0220	<0.00025	<0.00034	<0.00034	<0.00034	0.0009
MW-225	A	BICA	TDS	na	mg/L	1,230	1,210	931	964	901	924	956	993	737
MW-225	A	BICA	D. O.	na	mg/L	nm	nm	nm	nm	nm	nm	nm	nm	nm

Table VI.B.3.b - GROUNDWATER MONITORING SYSTEM RESULTS - BICA and SITE E PROGRAMS

Alon USA LP - Big Spring Refinery

Well No.	Screen	Program	Constituent	$^{GW}GW_{Class3}$ (mg/L)	Units	CURRENT PERMIT ANALYSIS								
						Mar-15	Jul-15	Jan-16	Jul-16	Jan-17	Jul-17	Jan-18	Jul-18	Jan-19
MW-221A	B	BICA	Benzene	0.5	mg/L	0.00240	<0.00034	0.00068	<0.00047	0.00074	0.00076	0.00059	0.00067	0.00052
MW-221A	B	BICA	TDS	na	mg/L	993	920	944	1,960	1,870	1,930	1,850	1,880	1,130
MW-221A	B	BICA	D. O.	na	mg/L	1.7	2.0	1.2	1.7	1.8	1.4	1.6	0.9	1.3
MW-221A	B	BICA	ORP	na	mV	nm	nm	nm	181.3	(88.4)	(48.2)	(125.0)	(91.6)	(34.9)
MW-221A	B	BICA	pH	na	stnd unit	6.85	7.14	7.23	7.05	7.06	6.97	7.02	6.96	6.95
MW-221A	B	BICA	Specific Conductance	na	µmhos/cm	nm	nm	nm	nm	nm	nm	2,300	2,219	1,666
MW-221A	B	BICA	Temperature	na	°C	nm	nm	nm	nm	nm	nm	23.20	27.00	20.70
MW-221A	B	BICA	Turbidity	na	NTU	nm	nm	nm	nm	nm	nm	5.50	5.30	7.40
MW-223	A	BICA	Benzene	0.5	mg/L	0.0010	<0.00034	<0.00047	<0.00047	<0.00047	<0.0003	<0.0003	<0.0004	<0.0004
MW-223	A	BICA	TDS	na	mg/L	1,630	1,570	1,460	1,420	1,530	1,450	1,750	1,670	1,940
MW-223	A	BICA	D. O.	na	mg/L	2.0	2.2	2.0	1.7	1.8	1.4	1.7	1.5	1.8
MW-223	A	BICA	ORP	na	mV	nm	nm	nm	93.1	58.9	99.7	81.8	111.5	118.0
MW-223	A	BICA	pH	na	stnd unit	5.87	6.94	7.07	6.98	6.91	7.05	7.07	6.83	6.86
MW-223	A	BICA	Specific Conductance	na	µmhos/cm	nm	nm	nm	nm	nm	nm	2,300	2,749	2,710
MW-223	A	BICA	Temperature	na	°C	nm	nm	nm	nm	nm	nm	22.70	27.10	20.40
MW-223	A	BICA	Turbidity	na	NTU	nm	nm	nm	nm	nm	nm	6.40	4.80	5.20
MW-223A	B	BICA	Benzene	0.5	mg/L	0.0007	<0.00034	<0.00047	<0.00047	<0.00047	<0.0003	<0.0003	<0.0004	<0.0004
MW-223A	B	BICA	TDS	na	mg/L	1,870	2,790	1,920	1,910	1,360	1,480	1,090	1,270	1,170
MW-223A	B	BICA	D. O.	na	mg/L	2.8	3.1	2.2	2.1	2.2	2.3	2.4	6.0	5.6
MW-223A	B	BICA	ORP	na	mV	nm	nm	nm	(109.1)	60.2	33.0	110.6	119.2	124.7
MW-223A	B	BICA	pH	na	stnd unit	6.86	6.91	6.73	6.96	6.74	6.96	7.13	7.03	7.07
MW-223A	B	BICA	Specific Conductance	na	µmhos/cm	nm	nm	nm	nm	nm	nm	1,712	1,667	1,517
MW-223A	B	BICA	Temperature	na	°C	nm	nm	nm	nm	nm	nm	22.40	26.60	20.10
MW-223A	B	BICA	Turbidity	na	NTU	nm	nm	nm	nm	nm	nm	17.00	9.70	9.40
MW-224	A	BICA	Benzene	0.5	mg/L	0.0006	<0.00034	<0.00047	<0.00047	<0.00047	<0.0003	<0.0003	<0.0004	<0.0004
MW-224	A	BICA	TDS	na	mg/L	1,600	1,490	1,430	1,400	1,420	1,410	1,410	1,440	1,500
MW-224	A	BICA	D. O.	na	mg/L	2.6	3.6	3.3	3.0	3.2	3.4	3.9	4.7	3.8
MW-224	A	BICA	ORP	na	mV	nm	nm	nm	113.1	46.5	86.2	96.7	123.0	134.1
MW-224	A	BICA	pH	na	stnd unit	6.78	6.87	6.97	7.05	7.06	7.04	6.97	6.82	6.91
MW-224	A	BICA	Specific Conductance	na	µmhos/cm	nm	nm	nm	nm	nm	nm	1,827	2,096	1,984
MW-224	A	BICA	Temperature	na	°C	nm	nm	nm	nm	nm	nm	22.00	24.90	19.30
MW-224	A	BICA	Turbidity	na	NTU	nm	nm	nm	nm	nm	nm	5.10	6.90	3.90
MW-224A	B	BICA	Benzene	0.5	mg/L	0.0006	<0.00034	<0.00047	<0.00047	<0.00047	<0.0003	<0.0003	<0.0004	<0.0004
MW-224A	B	BICA	TDS	na	mg/L	1,670	1,700	1,650	1,990	1,950	2,100	1,940	2,310	1,920
MW-224A	B	BICA	D. O.	na	mg/L	2.9	2.5	3.0	2.9	3.0	3.0	3.4	5.3	5.4
MW-224A	B	BICA	ORP	na	mV	nm	nm	nm	16.7	1.9	(14.5)	41.4	97.7	108.6
MW-224A	B	BICA	pH	na	stnd unit	6.98	6.90	6.98	6.94	6.91	6.82	6.88	6.93	6.88
MW-224A	B	BICA	Specific Conductance	na	µmhos/cm	nm	nm	nm	nm	nm	nm	2,150	2,468	2,220
MW-224A	B	BICA	Temperature	na	°C	nm	nm	nm	nm	nm	nm	21.40	26.10	19.50
MW-224A	B	BICA	Turbidity	na	NTU	nm	nm	nm	nm	nm	nm	6.80	6.50	5.20
MW-225	A	BICA	Benzene	0.5	mg/L	0.0005	<0.00034	<0.00047	<0.00047	<0.00047	<0.0003	<0.0003	<0.0004	<0.0004
MW-225	A	BICA	TDS	na	mg/L	900	738	729	708	690	729	691	664	656
MW-225	A	BICA	D. O.	na	mg/L	2.2	1.0	3.4	2.5	1.6	2.8	2.3	2.0	2.5

Table VI.B.3.b - GROUNDWATER MONITORING SYSTEM RESULTS - BICA and SITE E PROGRAMS

Alon USA LP - Big Spring Refinery

Well No.	Screen	Program	Constituent	$^{GW}GW_{Class3}$ (mg/L)	Units	CURRENT PERMIT ANALYSIS								
						Jul-19	Jan-20	Jul-20	Jan-21	Jul-21	Jan-22	Jul-22	Jan-23	Jul-23
MW-221A	B	BICA	Benzene	0.5	mg/L	<0.0004	0.00035	<0.0003	<0.0003	0.00058	<0.0003	<0.00023	0.00036	0.00056
MW-221A	B	BICA	TDS	na	mg/L	1,190	965	1,210	1,210	1,150	1,280	1,190	968	1,020
MW-221A	B	BICA	D. O.	na	mg/L	1.0	1.3	1.1	1.1	1.1	2.1	3.0	2.0	1.9
MW-221A	B	BICA	ORP	na	mV	(108.9)	(4.1)	(68.3)	(68.3)	59.2	61.5	109.1	43.1	25.5
MW-221A	B	BICA	pH	na	stnd unit	7.23	6.74	6.99	6.99	6.81	6.74	6.79	6.73	6.89
MW-221A	B	BICA	Specific Conductance	na	µmhos/cm	434	1,496	1,581	1,581	1,807	1,608	1,707	1,870	1,550
MW-221A	B	BICA	Temperature	na	°C	26.1	23.5	25.3	25.3	21.1	22.4	22.9	17.8	25.8
MW-221A	B	BICA	Turbidity	na	NTU	2.60	3.60	5.60	5.60	4.50	4.10	5.20	7.20	7.20
MW-223	A	BICA	Benzene	0.5	mg/L	<0.0004	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.00023	<0.00023	<0.00023
MW-223	A	BICA	TDS	na	mg/L	1,650	1,680	762	762	795	1,320	1,360	814	1,750
MW-223	A	BICA	D. O.	na	mg/L	2.5	1.4	2.6	2.6	4.5	4.7	4.3	5.0	3.6
MW-223	A	BICA	ORP	na	mV	109.7	184.2	31.2	31.2	64.4	56.3	43.8	38.1	109.2
MW-223	A	BICA	pH	na	stnd unit	6.87	6.82	7.19	7.19	7.09	7.05	6.87	6.95	7.14
MW-223	A	BICA	Specific Conductance	na	µmhos/cm	2,410	2,590	1,120	1,120	1,241	1,201	2,004	1,552	1,650
MW-223	A	BICA	Temperature	na	°C	27.6	22.6	22.3	22.3	19.6	22.5	23.0	16.6	28.1
MW-223	A	BICA	Turbidity	na	NTU	5.70	6.50	5.20	5.20	6.30	5.80	6.10	3.70	5.20
MW-223A	B	BICA	Benzene	0.5	mg/L	<0.0004	0.00032	<0.0003	<0.0003	<0.0003	<0.0003	<0.00023	<0.00023	<0.00023
MW-223A	B	BICA	TDS	na	mg/L	1,230	990	1,020	1,020	2,320	1,080	1,210	1,060	1,640
MW-223A	B	BICA	D. O.	na	mg/L	4.1	5.4	4.0	4.0	1.8	1.7	3.1	3.5	2.8
MW-223A	B	BICA	ORP	na	mV	124.9	196.1	78.2	78.2	(32.7)	(13.0)	49.6	97.9	160.8
MW-223A	B	BICA	pH	na	stnd unit	7.13	6.88	7.02	7.02	6.94	6.83	6.73	6.60	6.82
MW-223A	B	BICA	Specific Conductance	na	µmhos/cm	1,500	1,646	1,402	1,402	2,220	2,310	1,665	1,710	1,763
MW-223A	B	BICA	Temperature	na	°C	24.6	22.8	24.0	24.0	18.2	23.0	22.6	16.7	27.2
MW-223A	B	BICA	Turbidity	na	NTU	9.50	7.50	5.10	5.10	7.10	6.90	3.20	5.30	8.60
MW-224	A	BICA	Benzene	0.5	mg/L	<0.0004	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.00023	<0.00023	<0.00023
MW-224	A	BICA	TDS	na	mg/L	1,630	1,470	1,930	1,930	1,390	1,780	1,690	1,150	2,010
MW-224	A	BICA	D. O.	na	mg/L	3.5	4.2	3.7	3.7	5.0	4.7	5.3	5.0	2.7
MW-224	A	BICA	ORP	na	mV	117.4	196.5	104.1	104.1	201.6	186.9	62.7	33.4	129.1
MW-224	A	BICA	pH	na	stnd unit	6.93	6.78	6.83	6.83	6.84	6.85	6.88	6.72	6.99
MW-224	A	BICA	Specific Conductance	na	µmhos/cm	1,984	2,110	2,310	2,310	2,460	2,260	2,520	2,390	1,933
MW-224	A	BICA	Temperature	na	°C	26.0	22.1	24.5	24.5	20.8	22.2	22.3	17.2	25.4
MW-224	A	BICA	Turbidity	na	NTU	4.80	5.50	4.60	4.60	5.10	4.50	5.50	6.50	7.10
MW-224A	B	BICA	Benzene	0.5	mg/L	<0.0004	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.00023	<0.00023	<0.00023
MW-224A	B	BICA	TDS	na	mg/L	1,890	1,630	2,050	2,050	1,580	1,730	1,740	1,620	2,180
MW-224A	B	BICA	D. O.	na	mg/L	4.6	4.2	5.5	5.5	5.7	5.2	5.1	5.0	4.8
MW-224A	B	BICA	ORP	na	mV	111.2	193.1	106.7	106.7	195.2	182.6	(101.4)	18.1	69.5
MW-224A	B	BICA	pH	na	stnd unit	6.98	6.65	6.96	6.96	6.80	6.86	6.78	6.69	6.86
MW-224A	B	BICA	Specific Conductance	na	µmhos/cm	2,200	2,240	2,220	2,220	2,380	2,360	2,180	2,170	1,920
MW-224A	B	BICA	Temperature	na	°C	26.5	22.7	26.0	26.0	21.1	22.5	23.9	17.1	27.4
MW-224A	B	BICA	Turbidity	na	NTU	25.20	3.20	17.90	17.90	20.60	18.20	19.10	20.30	26.40
MW-225	A	BICA	Benzene	0.5	mg/L	<0.0004	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.00023	<0.00023	<0.00023
MW-225	A	BICA	TDS	na	mg/L	680	711	707	707	824	979	781	614	712
MW-225	A	BICA	D. O.	na	mg/L	1.7	2.4	2.9	2.9	1.8	1.5	1.7	2.0	2.3

Table VI.B.3.b - GROUNDWATER MONITORING SYSTEM RESULTS - BICA and SITE E PROGRAMS

Alon USA LP - Big Spring Refinery

Well No.	Screen	Program	Constituent	$^{GW}GW_{Class3}$ (mg/L)	Units	PRE-PERMIT ANALYSIS								
						Jul-10	Jan-11	Jul-11	Jan-12	Jul-12	Jan-13	Jul-13	Jan-14	Jul-14
MW-225	A	BICA	**ORP**	**na**	**mV**	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-225	A	BICA	**pH**	**na**	**stnd unit**	8.03	7.20	8.35	7.22	7.90	7.15	6.29	8.41	6.94
MW-225	A	BICA	**Specific Conductance**	**na**	**µmhos/cm**	1,493	1,420	1,310	1	1,380	1,410	1,310	1,410	1,100
MW-225	A	BICA	**Temperature**	**na**	**°C**	20.29	18.80	24.24	20.70	22.51	20.53	20.48	19.67	26.18
MW-225	A	BICA	**Turbidity**	**na**	**NTU**	3.69	0.00	0.50	0.00	0.00	0.00	0.00	0.00	0.00
MW-225A	B	BICA	**Benzene**	**0.5**	**mg/L**	0.0011	<0.001	0.0007	<0.00025	<0.00025	<0.0018	<0.00034	<0.00034	0.0005
MW-225A	B	BICA	**TDS**	**na**	**mg/L**	7,280	5,800	4,260	4,840	3,210	4,860	4,920	5,140	4,590
MW-225A	B	BICA	**D. O.**	**na**	**mg/L**	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-225A	B	BICA	**ORP**	**na**	**mV**	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-225A	B	BICA	**pH**	**na**	**stnd unit**	7.46	6.68	8.56	7.65	9.49	7.49	6.53	8.88	7.78
MW-225A	B	BICA	**Specific Conductance**	**na**	**µmhos/cm**	6,768	7,260	7,210	7,000	43	7,180	5,480	2,920	1,230
MW-225A	B	BICA	**Temperature**	**na**	**°C**	19.85	17.80	23.51	20.43	26.47	18.66	21.64	19.73	24.82
MW-225A	B	BICA	**Turbidity**	**na**	**NTU**	67.20	0.00	61.50	87.10	450.00	120.00	0.00	340.00	63.40
MW-227	A	BICA	**Benzene**	**0.5**	**mg/L**	0.0180	0.0170	<0.00025	0.0231	0.0180	0.0199	0.0173	0.0196	0.0213
MW-227	A	BICA	**TDS**	**na**	**mg/L**	3,690	3,820	3,980	3,490	3,750	3,960	4,230	4,480	4,490
MW-227	A	BICA	**D. O.**	**na**	**mg/L**	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-227	A	BICA	**ORP**	**na**	**mV**	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-227	A	BICA	**pH**	**na**	**stnd unit**	7.24	7.21	7.03	7.24	7.86	7.24	6.60	8.44	7.03
MW-227	A	BICA	**Specific Conductance**	**na**	**µmhos/cm**	6,290	900	5,660	7	6,040	5,930	6,150	6,450	6,610
MW-227	A	BICA	**Temperature**	**na**	**°C**	24.30	18.40	29.92	18.34	22.34	20.57	19.91	20.16	24.82
MW-227	A	BICA	**Turbidity**	**na**	**NTU**	8.50	0.00	0.00	5.90	15.70	0.00	0.00	5.30	0.00
MW-227A	B	BICA	**Benzene**	**0.5**	**mg/L**	0.04700	0.03600	0.01790	0.01090	0.01080	0.00840	0.00470	0.00540	0.00380
MW-227A	B	BICA	**TDS**	**na**	**mg/L**	6,880	8,470	6,220	6,060	6,430	6,620	6,680	6,960	6,640
MW-227A	B	BICA	**D. O.**	**na**	**mg/L**	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-227A	B	BICA	**ORP**	**na**	**mV**	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-227A	B	BICA	**pH**	**na**	**stnd unit**	6.62	7.19	6.63	6.83	7.54	6.85	5.71	6.53	7.04
MW-227A	B	BICA	**Specific Conductance**	**na**	**µmhos/cm**	11,200	9,310	9,020	11	9,880	9,250	9,250	10	6,650
MW-227A	B	BICA	**Temperature**	**na**	**°C**	22.90	19.10	27.30	18.56	23.12	20.57	20.27	18.77	24.82
MW-227A	B	BICA	**Turbidity**	**na**	**NTU**	11.20	0.00	17.70	0.00	10.20	0.00	0.00	20.80	0.00
RW-228	A	BICA	**Benzene**	**0.5**	**mg/L**	PSH	PSH	PSH	PSH	PSH	PSH	PSH	PSH	PSH
RW-228	A	BICA	**TDS**	**na**	**mg/L**	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness
RW-228	A	BICA	**D. O.**	**na**	**mg/L**	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet
RW-228	A	BICA	**ORP**	**na**	**mV**	3.89	3.07	2.79	3.88	4.55	4.59	4.37	4.46	4.79
RW-228	A	BICA	**pH**	**na**	**stnd unit**	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-228	A	BICA	**Specific Conductance**	**na**	**µmhos/cm**	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-228	A	BICA	**Temperature**	**na**	**°C**	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-228	A	BICA	**Turbidity**	**na**	**NTU**	nm	nm	nm	nm	nm	nm	nm	nm	nm

na - Not Applicable
ms - constituent Not Sampled
nm - field constituent Not Measured
nc - Field Meter Non-Operable

PSH - Phase Seperated Hydrocarbon
OFF-LINE - Production Well Tagged-Out for Maintenance/Repairs
DRY - No fluids in well
<PUMP - Fluid Level Below Pump In-Take

Table VI.B.3.b - GROUNDWATER MONITORING SYSTEM RESULTS - BICA and SITE E PROGRAMS

Alon USA LP - Big Spring Refinery

Well No.	Screen	Program	Constituent	$^{GW}GW_{Class3}$ (mg/L)	Units	CURRENT PERMIT ANALYSIS								
						Mar-15	Jul-15	Jan-16	Jul-16	Jan-17	Jul-17	Jan-18	Jul-18	Jan-19
MW-225	A	BICA	ORP	na	mV	nm	nm	nm	48.6	65.0	100.2	(123.5)	(99.3)	75.4
MW-225	A	BICA	pH	na	stnd unit	7.01	7.08	7.08	7.14	7.07	6.86	6.92	6.72	6.86
MW-225	A	BICA	Specific Conductance	na	µmhos/cm	nm	nm	nm	nm	nm	nm	1,000	990	741
MW-225	A	BICA	Temperature	na	°C	nm	nm	nm	nm	nm	nm	19.90	23.90	20.40
MW-225	A	BICA	Turbidity	na	NTU	nm	nm	nm	nm	nm	nm	3.20	1.50	2.40
MW-225A	B	BICA	Benzene	0.5	mg/L	<0.00034	<0.00034	<0.00047	<0.00047	<0.00047	<0.0003	<0.0003	<0.0004	<0.0004
MW-225A	B	BICA	TDS	na	mg/L	5,120	4,750	4,570	3,970	4,770	5,600	4,860	4,890	6,450
MW-225A	B	BICA	D. O.	na	mg/L	2.5	0.7	2.0	1.2	0.9	2.6	2.0	1.4	1.4
MW-225A	B	BICA	ORP	na	mV	nm	nm	nm	(93.7)	(79.4)	(182.4)	(163.8)	(141.7)	(66.8)
MW-225A	B	BICA	pH	na	stnd unit	5.65	6.70	6.82	6.96	6.64	6.69	6.62	6.48	6.63
MW-225A	B	BICA	Specific Conductance	na	µmhos/cm	nm	nm	nm	nm	nm	nm	6,210	6,280	4,910
MW-225A	B	BICA	Temperature	na	°C	nm	nm	nm	nm	nm	nm	19.80	26.70	20.40
MW-225A	B	BICA	Turbidity	na	NTU	nm	nm	nm	nm	nm	nm	5.90	5.00	1.80
MW-227	A	BICA	Benzene	0.5	mg/L	<0.00034	0.0166	0.0243	0.0196	0.0189	0.0155	0.0066	0.0066	0.0013
MW-227	A	BICA	TDS	na	mg/L	4,900	5,000	4,930	4,710	5,030	5,700	5,260	5,180	5,100
MW-227	A	BICA	D. O.	na	mg/L	1.7	0.8	0.9	2.0	1.1	2.4	2.0	1.6	2.9
MW-227	A	BICA	ORP	na	mV	nm	nm	nm	(127.1)	(124.6)	(245.4)	(240.0)	(192.8)	(96.9)
MW-227	A	BICA	pH	na	stnd unit	7.13	7.12	7.29	7.31	7.12	7.12	7.11	6.69	6.86
MW-227	A	BICA	Specific Conductance	na	µmhos/cm	nm	nm	nm	nm	nm	nm	7,140	7,260	5,740
MW-227	A	BICA	Temperature	na	°C	nm	nm	nm	nm	nm	nm	19.90	25.70	19.10
MW-227	A	BICA	Turbidity	na	NTU	nm	nm	nm	nm	nm	nm	3.60	2.50	2.00
MW-227A	B	BICA	Benzene	0.5	mg/L	0.00270	0.00110	0.00096	0.00086	0.00160	0.00070	0.00037	0.00690	<0.0004
MW-227A	B	BICA	TDS	na	mg/L	6,830	6,530	6,440	5,850	5,770	7,400	4,860	5,310	4,490
MW-227A	B	BICA	D. O.	na	mg/L	1.7	3.0	1.1	1.6	1.2	2.7	2.2	1.6	1.4
MW-227A	B	BICA	ORP	na	mV	nm	nm	nm	(71.9)	(122.9)	172.1	(169.3)	(173.4)	(63.5)
MW-227A	B	BICA	pH	na	stnd unit	6.75	6.65	6.81	6.85	6.69	6.74	6.69	6.56	6.68
MW-227A	B	BICA	Specific Conductance	na	µmhos/cm	nm	nm	nm	nm	nm	nm	6,120	7,130	5,140
MW-227A	B	BICA	Temperature	na	°C	nm	nm	nm	nm	nm	nm	18.90	24.40	18.10
MW-227A	B	BICA	Turbidity	na	NTU	nm	nm	nm	nm	nm	nm	6.30	4.10	8.60
RW-228	A	BICA	Benzene	0.5	mg/L	PSH	PSH	PSH	PSH	PSH	PSH	PSH	PSH	PSH
RW-228	A	BICA	TDS	na	mg/L	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness
RW-228	A	BICA	D. O.	na	mg/L	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet
RW-228	A	BICA	ORP	na	mV	3.92	3.74	3.12	2.60	2.15	1.97	2.00	2.76	3.98
RW-228	A	BICA	pH	na	stnd unit	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-228	A	BICA	Specific Conductance	na	µmhos/cm	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-228	A	BICA	Temperature	na	°C	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-228	A	BICA	Turbidity	na	NTU	nm	nm	nm	nm	nm	nm	nm	nm	nm

na - Not Applicable
ms - constituent Not Sampled
nm - field constituent Not Measured
nc - Field Meter Non-Operable

PSH - Phase Seperated Hydrocarbon
OFF-LINE - Production Well Tagged-Out for Maintenance/Repairs
DRY - No fluids in well
<PUMP - Fluid Level Below Pump In-Take

Table VI.B.3.b - GROUNDWATER MONITORING SYSTEM RESULTS - BICA and SITE E PROGRAMS

Alon USA LP - Big Spring Refinery

Well No.	Screen	Program	Constituent	$^{GW}GW_{Class3}$ (mg/L)	Units	CURRENT PERMIT ANALYSIS								
						Jul-19	Jan-20	Jul-20	Jan-21	Jul-21	Jan-22	Jul-22	Jan-23	Jul-23
MW-225	A	BICA	**ORP**	**na**	**mV**	14.9	13.5	21.7	21.7	10.1	32.9	55.8	55.3	17.1
MW-225	A	BICA	**pH**	**na**	**stnd unit**	7.00	7.08	6.95	6.95	6.94	7.02	6.87	6.81	6.65
MW-225	A	BICA	**Specific Conductance**	**na**	**µmhos/cm**	759	921	944	944	1,172	1,401	1,379	1,776	1,842
MW-225	A	BICA	**Temperature**	**na**	**°C**	22.4	16.7	21.4	21.4	20.7	22.6	25.8	17.6	25.4
MW-225	A	BICA	**Turbidity**	**na**	**NTU**	3.50	4.30	3.30	3.30	3.60	3.40	2.90	2.30	4.70
MW-225A	B	BICA	**Benzene**	**0.5**	**mg/L**	<0.0004	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.00023	<0.00023	<0.00023
MW-225A	B	BICA	**TDS**	**na**	**mg/L**	4,780	4,780	4,580	4,580	4,360	4,200	4,180	3,960	5,120
MW-225A	B	BICA	**D. O.**	**na**	**mg/L**	1.3	1.5	1.3	1.3	1.4	1.2	1.1	1.2	1.6
MW-225A	B	BICA	**ORP**	**na**	**mV**	(101.4)	(41.3)	(101.2)	(101.2)	(55.0)	(100.7)	(86.2)	(79.2)	(72.9)
MW-225A	B	BICA	**pH**	**na**	**stnd unit**	6.76	6.71	6.67	6.67	6.65	6.59	6.62	6.56	6.44
MW-225A	B	BICA	**Specific Conductance**	**na**	**µmhos/cm**	4,210	4,820	4,820	4,820	4,670	6,220	6,050	6,890	7,450
MW-225A	B	BICA	**Temperature**	**na**	**°C**	24.3	17.2	22.1	22.1	20.9	23.2	25.4	18.0	25.6
MW-225A	B	BICA	**Turbidity**	**na**	**NTU**	13.80	8.10	9.20	9.20	8.50	7.10	4.90	4.20	3.90
MW-227	A	BICA	**Benzene**	**0.5**	**mg/L**	0.0010	0.0006	<0.0003	<0.0003	<0.0003	0.00034	0.00390	0.00068	0.01040
MW-227	A	BICA	**TDS**	**na**	**mg/L**	5,040	4,550	4,650	4,650	4,430	4,520	4,440	3,980	5,580
MW-227	A	BICA	**D. O.**	**na**	**mg/L**	3.4	2.1	2.1	2.1	2.0	1.7	1.5	1.9	1.7
MW-227	A	BICA	**ORP**	**na**	**mV**	(162.5)	(95.8)	182.3	182.3	(115.4)	(171.4)	(161.3)	(62.7)	(128.3)
MW-227	A	BICA	**pH**	**na**	**stnd unit**	7.03	6.99	7.06	7.06	7.01	7.11	6.86	6.79	6.86
MW-227	A	BICA	**Specific Conductance**	**na**	**µmhos/cm**	5,090	6,030	5,480	5,480	6,020	6,860	7,030	8,050	7,110
MW-227	A	BICA	**Temperature**	**na**	**°C**	22.1	20.2	20.2	20.2	20.9	21.6	25.3	17.4	23.8
MW-227	A	BICA	**Turbidity**	**na**	**NTU**	1.30	2.60	2.00	2.00	2.70	3.60	4.10	5.10	8.40
MW-227A	B	BICA	**Benzene**	**0.5**	**mg/L**	<0.0004	0.00067	<0.0003	<0.0003	<0.0003	0.00042	0.00034	<0.00023	<0.00023
MW-227A	B	BICA	**TDS**	**na**	**mg/L**	3,140	2,360	2,880	2,880	3,440	4,090	4,080	3,970	5,940
MW-227A	B	BICA	**D. O.**	**na**	**mg/L**	1.3	1.2	1.1	1.1	1.4	1.1	0.9	1.1	1.2
MW-227A	B	BICA	**ORP**	**na**	**mV**	(128.7)	(107.1)	(153.4)	(153.4)	(80.6)	(131.2)	(102.9)	(102.9)	(92.7)
MW-227A	B	BICA	**pH**	**na**	**stnd unit**	6.89	6.97	6.84	6.84	6.82	6.72	6.98	6.86	6.38
MW-227A	B	BICA	**Specific Conductance**	**na**	**µmhos/cm**	3,910	4,010	3,810	3,810	4,210	5,840	6,130	6,540	8,080
MW-227A	B	BICA	**Temperature**	**na**	**°C**	22.7	20.1	21.2	21.2	20.4	22.1	25.8	17.7	24.6
MW-227A	B	BICA	**Turbidity**	**na**	**NTU**	4.50	4.70	3.80	3.80	2.90	2.80	3.40	2.90	5.60
RW-228	A	BICA	**Benzene**	**0.5**	**mg/L**	PSH	PSH	PSH	PSH	PSH	PSH	PSH	PSH	PSH
RW-228	A	BICA	**TDS**	**na**	**mg/L**	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness
RW-228	A	BICA	**D. O.**	**na**	**mg/L**	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet	In Feet
RW-228	A	BICA	**ORP**	**na**	**mV**	4.20	3.61	3.33	1.89	2.18	1.84	1.71	1.67	1.78
RW-228	A	BICA	**pH**	**na**	**stnd unit**	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-228	A	BICA	**Specific Conductance**	**na**	**µmhos/cm**	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-228	A	BICA	**Temperature**	**na**	**°C**	nm	nm	nm	nm	nm	nm	nm	nm	nm
RW-228	A	BICA	**Turbidity**	**na**	**NTU**	nm	nm	nm	nm	nm	nm	nm	nm	nm

na - Not Applicable
ms - constituent Not Sampled
nm - field constituent Not Measured
nc - Field Meter Non-Operable

PSH - Phase Seperated Hydrocarbon
OFF-LINE - Production Well Tagged-Out for Maintenance/Repairs
DRY - No fluids in well
<PUMP - Fluid Level Below Pump In-Take

Table VI.B.3.c.[1] – Groundwater Detection Monitoring Parameters
(from Page 115 of the Part B Application)

Unit/Waste Management Area: **SITE H LAND TREATMENT UNIT**
Well No(s): **MW-52, MW-52A, MW-53, MW-53A, MW-54, MW-54A, MW-74, MW-74A, MW-75, MW-75A, MW-76, MW-76A, MW-77, MW-77A**

Parameter	Sampling Frequency	Analytical Method Method Listed or Currently Accepted Method	Method Detection Limit (MDL) or Method Quantification Limit (MQL) Value, (units), MDL or MQL[2]	Concentration Limit[1]
ARSENIC	Annual	SW846 – 6020A	MQL 0.005 mg/l	0.014 mg/l
CHROMIUM, TOTAL	Annual	SW846 – 6020A	MQL 0.005 mg/l	0.026 mg/l
LEAD	Annual	SW846 – 6020A	MQL 0.005 mg/l	0.01 mg/l
SELENIUM	Annual	SW846 – 6020A	MQL 0.025 mg/l	0.1 mg/l
BENZENE	Annual	SW846 – 8260B	MQL 0.001 mg/l	0.002 mg/l
TOLUENE	Annual	SW846 – 8260B	MQL 0.001 mg/l	0.002 mg/l
PHENOLICS	Annual	SW846 - 9065	MQL 0.005 mg/l	0.015 mg/l
If a Potential SSI is determined, the well will be re-sampled for the Skinner List Constituents. The Skinner List Constituents are identified in Table VI.B.3.c[2]				

1 The concentration limit is the basis for determining whether a release has occurred from the waste management unit/area.

2 a. Enter the laboratory expected *Method Detection Limit* if determination of *Statistically Significant Increase* (SSI) occurrence is based on detection of the presence of the constituent of concern in the sample.

2 b. Enter the laboratory expected Method Quantification Limit if determination of SSI is based on statistical analysis of detection monitoring data or direct comparison to a limit value.

This should be based on the laboratory's minimum expected level of performance. Please designate which type of limit has been entered for each constituent, with its value and units.

Table VI.B.3.c[2] *Supplemental*

MODIFIED SKINNER LIST GROUNDWATER SAMPLE ANALYSIS

Parameter	Sampling Frequency	Analytical Method	Reporting Limits (in mg/L)	$^{GW}GW_{class3}$ PCL (Residential
VOLITILE ORGANIC COMPOUNDS:				
Benzene	If SSI Identified	SW846 8260B	0.001	0.5
Chlorobenzene	If SSI Identified	SW846 8260B	0.001	10
Chloroform	If SSI Identified	SW846 8260B	0.001	8
Carbon disulfide	If SSI Identified	SW846 8260B	0.001	240
Dibromoethane, 1,2-	If SSI Identified	SW846 8260B	0.001	0.005
Dichloroethane, 1,1-	If SSI Identified	SW846 8260B	0.001	490
Dichloroethane, 1,2-	If SSI Identified	SW846 8260B	0.001	0.5
Dioxane, 1,4-	If SSI Identified	SW846 8260B	0.13	0.91
Ethylbenzene	If SSI Identified	SW846 8260B	0.001	70
Methyl ethyl ketone	If SSI Identified	SW846 8260B	0.013	1500
Methyl Tert Butyl Ether	If SSI Identified	SW846 8260B	0.001	24
Styrene	If SSI Identified	SW846 8260B	0.001	10
Tetrachloroethylene	If SSI Identified	SW846 8260B	0.001	0.5
Toluene	If SSI Identified	SW846 8260B	0.001	100
Trichloroethane, 1,1,1-	If SSI Identified	SW846 8260B	0.001	20
Trichloroethylene	If SSI Identified	SW846 8260B	0.001	0.5
Xylene (total)	If SSI Identified	SW846 8260B	0.002	1000
SEMIVOLATILE ORGANIC COMPOUNDS:				
Benzenethiol	If SSI Identified	SW846, 8270D	0.048	2.4
Dimethylphenol, 2,4-	If SSI Identified	SW846, 8270D	0.0048	49
Dinitrophenol, 2,4-	If SSI Identified	SW846, 8270D	0.019	4.9
Methylphenol, 2-	If SSI Identified	SW846, 8270D	0.0048	120
Methylphenol, 3&4-	If SSI Identified	SW846, 8270D	0.0048	12
Nitrophenol, 4-	If SSI Identified	SW846, 8270D	0.024	4.9
Phenol	If SSI Identified	SW846, 8270D	0.0048	730
Acenaphthene	If SSI Identified	SW846, 8270D	0.00019	150
Anthracene	If SSI Identified	SW846, 8270D	0.00019	730
Benzo(a)anthracene	If SSI Identified	SW846, 8270D	0.00019	0.91
Benzo(a)pyrene	If SSI Identified	SW846, 8270D	0.00019	0.02
Benzo(b)fluoranthene	If SSI Identified	SW846, 8270D	0.00019	0.91
Benzo(k)fluoranthene	If SSI Identified	SW846, 8270D	0.00019	9.1
Chrysene	If SSI Identified	SW846, 8270D	0.00019	91
Dibenz(a,h)acridine	If SSI Identified	SW846, 8270D	0.0048	0.076
Dibenzo(a,h)anthracene	If SSI Identified	SW846, 8270D	0.00019	0.02
Dichlorobenzene, 1,2-	If SSI Identified	SW846, 8270D	0.0048	60
Dichlorobenzene, 1,3-	If SSI Identified	SW846, 8270D	0.0048	73
Dichlorobenzene, 1,4-	If SSI Identified	SW846, 8270D	0.0048	7.5
Diethyl phthalate	If SSI Identified	SW846, 8270D	0.0048	2000
Dimethyl phthalate	If SSI Identified	SW846, 8270D	0.0048	2000
Di-n-butyl phthalate	If SSI Identified	SW846, 8270D	0.0048	240
bis(2-Ethylhexyl)phthalate	If SSI Identified	SW846, 8270D	0.0048	0.6

Table VI.B.3.c[2] *Supplemental*

MODIFIED SKINNER LIST GROUNDWATER SAMPLE ANALYSIS

Parameter	Sampling Frequency	Analytical Method	Reporting Limits (in mg/L)	$^{GW}GW_{class3}$ PCL (Residential
Fluoranthene	If SSI Identified	SW846, 8270D	0.00019	98
Fluorene	If SSI Identified	SW846, 8270D	0.00019	98
Indene	If SSI Identified	SW846, 8270D	0.0097	49
Indeno(1,2,3-cd)pyrene	If SSI Identified	SW846, 8270D	0.00019	0.91
Methylnaphthalene, 2-	If SSI Identified	SW846, 8270D	0.00019	9.8
Naphthalene	If SSI Identified	SW846, 8270D	0.00019	49
Phenanthrene	If SSI Identified	SW846, 8270D	0.00019	23
Pyrene	If SSI Identified	SW846, 8270D	0.00019	73
Pyridine	If SSI Identified	SW846, 8270D	0.0048	2.4
Quinoline	If SSI Identified	SW846, 8270D	0.0048	0.03
INORGANIC METALS ANALYSIS:				
Antimony	If SSI Identified	SW846, 6020A	0.005	60
Arsenic	If SSI Identified	SW846, 6020A	0.005	1
Barium	If SSI Identified	SW846, 6020A	0.005	200
Beryllium	If SSI Identified	SW846, 6020A	0.005	0.4
Cadmium	If SSI Identified	SW846, 6020A	0.0025	0.5
Chromium	If SSI Identified	SW846, 6020A	0.005	10
Cobalt	If SSI Identified	SW846, 6020A	0.005	24
Lead	If SSI Identified	SW846, 6020A	0.005	1.5
Mercury	If SSI Identified	SW846, 7470A	0.0002	0.2
Nickel	If SSI Identified	SW846, 6020A	0.005	49
Selenium	If SSI Identified	SW846, 6020A	0.025	5
Silver	If SSI Identified	SW846, 6020A	0.005	12
Zinc	If SSI Identified	SW846, 6020A	0.025	730

Table VI.D.

Current and Historic Constituents Monitored
Site H Land Treatment Unit
Alon USA, LP - Big Spring Refinery

Soil-Core, Soil Sampling:				
Constituent	**1995 - 2001**	**2001-2002**	**2003-Present**	**Proposed 2024+**
Arsenic	YES	YES	YES	YES
Benzene	YES	YES	YES	YES
Beryllium	YES	YES		
Cadmium	YES	YES		
Chromium, total	YES	YES	YES	YES
Copper	YES	YES		
Kjeldahl Nitrogen	YES	YES		
Lead	YES	YES	YES	YES
Naphthalene	YES	YES	YES	YES
Nickel	YES	YES	YES	YES
Phenanthrene	YES	YES	YES	YES
Selenium	YES	YES	YES	YES
TOC	YES			
Toluene	YES	YES	YES	YES
Vanadium	YES	YES		
Xylenes, total	YES	YES	YES	YES
Zinc	YES	YES		
Moisture	YES			
pH	YES			
Specific Conductance	YES			

Number of Sampling Locations: 8 locations (2 per cell)
Depth of Soil Core Samples: 50-inches to 64-inches
Sampling Equipment: GeoProbe® Rig with hydraulic-push Shelby-Tube Sampler

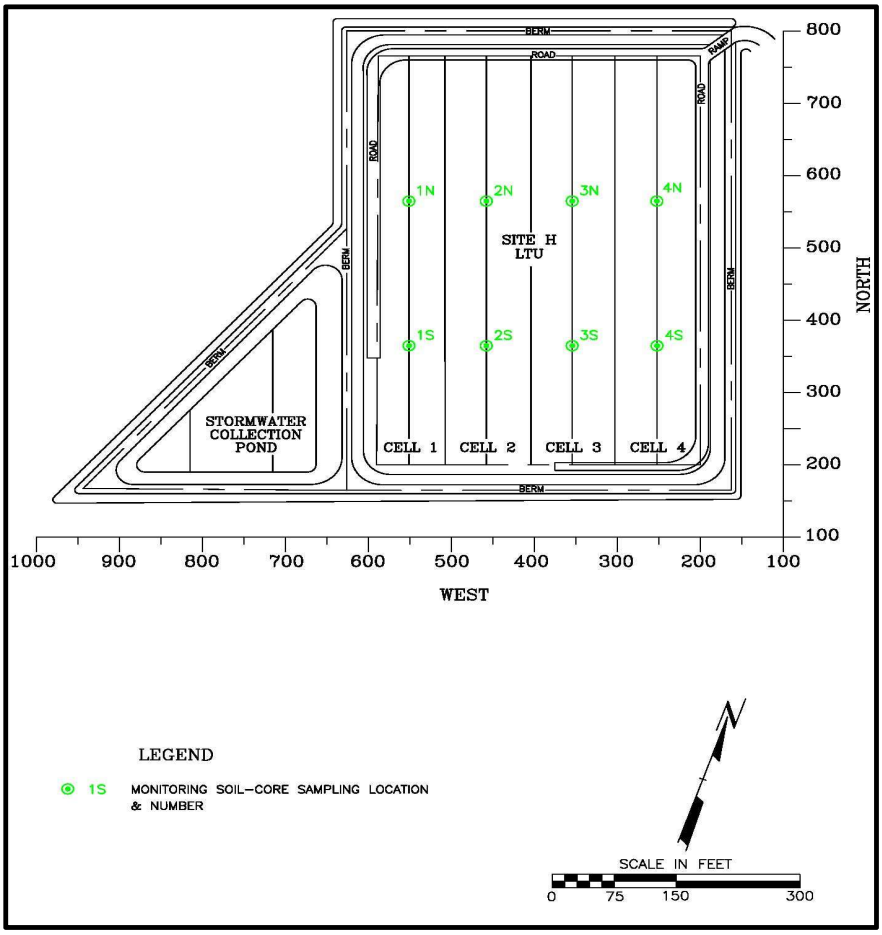


Table VI.D.

Current and Historic Constituents Monitored
Site H Land Treatment Unit
Alon USA, LP - Big Spring Refinery

Soil-Pore Liquid Sampling:				
Constituent	**1995 - 2001**	**2001-2002**	**2003-Present**	**Proposed 2024+**
Arsenic	YES	YES	YES	YES
Benzene	YES	YES	YES	YES
Chromium, hexavalent	YES	YES	YES	YES
Lead	YES	YES	YES	YES
Naphthalene	YES	YES	YES	YES
Nickel	YES	YES	YES	YES
pH	YES	YES	YES	YES
Phenanthrene	YES	YES	YES	YES
Selenium	YES	YES	YES	YES
Specific Conductance	YES	YES	YES	YES
Temperature	YES	YES	YES	YES
Toluene	YES	YES	YES	YES
Xylenes, total	YES	YES	YES	YES
TOC	YES			

Number of Sampling Locations: 4 locations, 1 per cell
Depth of Leachate Samples: 12 to 15-feet below top sample pipe
Sampling Equipment: Peristaltic pump & dedicated tubing

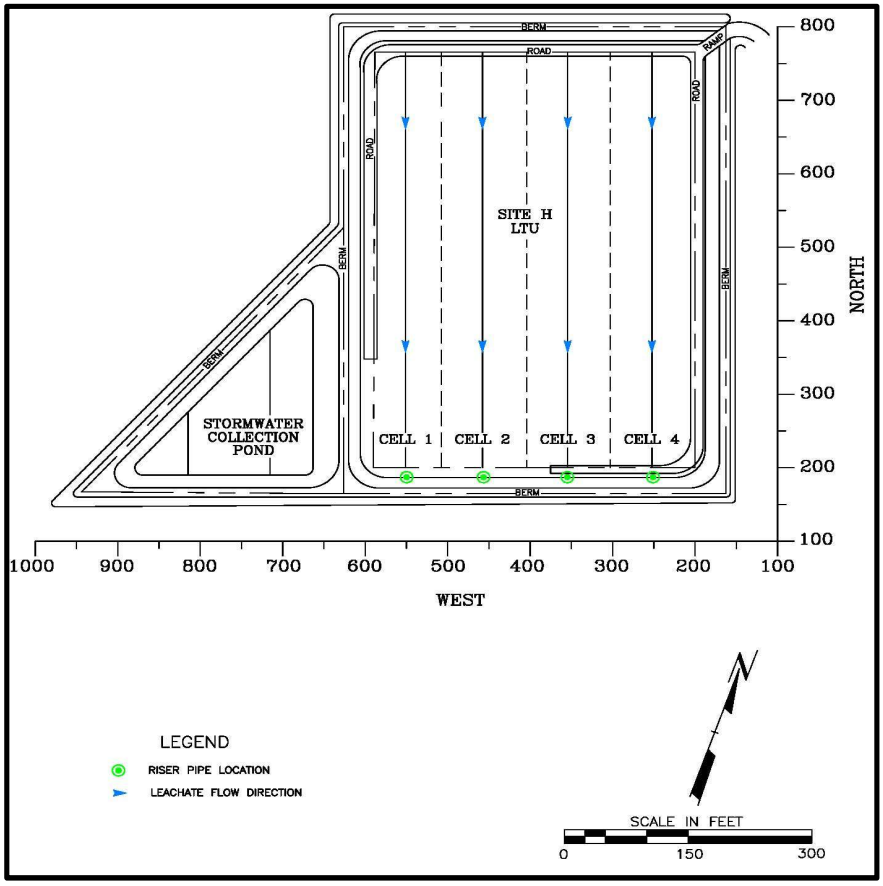


Table VI.D.

Current and Historic Constituents Monitored
Site H Land Treatment Unit
Alon USA, LP - Big Spring Refinery

Groundwater Sampling:				
Constituent	1995 - 2001	2001-2002	2003-Present	Proposed 2024+
Alkalinity, bicarb		YES		
Ammonia	YES	YES		
Arsenic	YES	YES	YES	YES
Benzene	YES	YES	YES	YES
Bicarbonate	YES			
Calcium	YES	YES		
Chloride	YES	YES		
Chromium	YES	YES	YES	YES
Lead	YES	YES	YES	YES
Magnesium	YES	YES		
N-Nitrate	YES	YES		
pH	YES	YES	YES	YES
Phenolics		YES	YES	YES
Selenium	YES	YES	YES	YES
Sodium	YES	YES		
Specific Conductance		YES	YES	YES
Sulfate	YES	YES		
Temperature		YES	YES	YES
Toluene	YES	YES	YES	YES
Total Dissolved Solids	YES	YES		
Total Organic Carbon	YES	YES		
Total Phenolics	YES			
Turbidity		YES	YES	YES

Number of Sampling Locations: 14 monitor wells (7 shallow, 7 deep)
Depth of Samples: ~115-feet below grade
Sampling Equipment: Dedicated pneumatic sampling pump

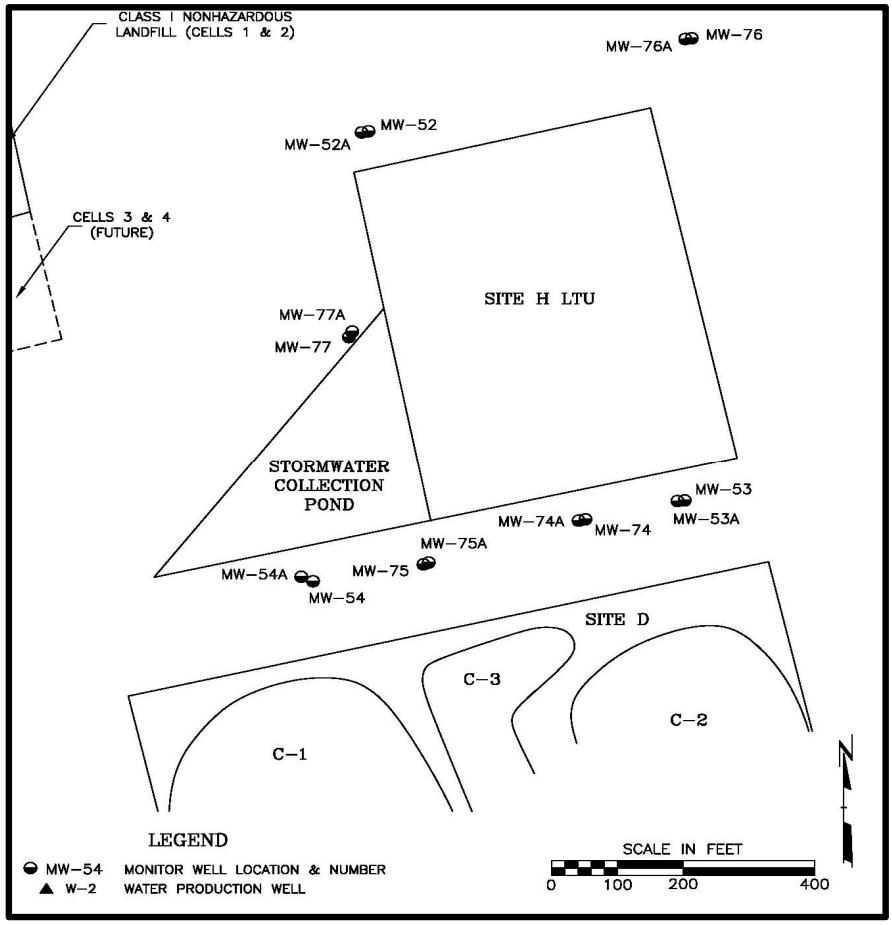


Table VI.B.3.a - Site H Historical Groundwater Analysis
Alon USA LP - Big Spring Refinery

Well	Analyte	Units	GWPS mg/L	Jul-92	Oct-92	Jan-93	Apr-93	Jul-93	Jan-94	Jul-94	Jan-95	Jul-95	Jan-96	Jul-96
MW-52	Benzene	mg/L	*0.002*	< 1.0	< 1.0	< 1.0	<1.0	< 1.0	< 1.0	< 1.0	<1.0	< 1.0	< 1.0	< 1.0
MW-52	Toluene	mg/L	*0.002*	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
MW-52	Phenolics	mg/L	*0.015*	0.001	<0.005	< 0.005	0.010	< 0.005	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.010
MW-52	Arsenic	mg/L	*0.014*	0.0080	0.0100	0.0090	0.0120	0.0050	< 0.005	0.0080	0.0080	0.0090	0.0090	0.0160
MW-52	Chromium	mg/L	*0.026*	<0.005	<0.005	< 0.01	<0.01	<0.05	< 0.01	< 0.005	< 0.002	< 0.002	< 0.002	0.005
MW-52	Lead	mg/L	*0.01*	<0.005	<0.005	< 0.005	<0.004	< 0.002	< 0.002	0.015	<0.005	0.013	0.011	0.021
MW-52	Selenium	mg/L	*0.1*	<0.05	0.0500	<0.05	<0.05	<0.05	<0.05	< 0.005	0.0130	< 0.005	< 0.005	0.0050
MW-52	D. O.	mg/L	na	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-52	ORP	mV	na	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-52	pH	S. U.	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-52	Conductance	µmhos/cm	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-52	Temperature	°C	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-52	Turbidity	NTU	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-52A	Benzene	mg/L	*0.002*	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MW-52A	Toluene	mg/L	*0.002*	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MW-52A	Phenolics	mg/L	*0.015*	0.015	<0.005	< 0.005	0.020	<0.005	< 0.01	< 0.01	<0.01	0.030	< 0.01	< 0.01
MW-52A	Arsenic	mg/L	*0.014*	0.0080	0.0110	0.0080	0.0120	0.0080	0.0060	0.0080	0.0100	0.0110	0.0100	0.0110
MW-52A	Chromium	mg/L	*0.026*	0.006	0.008	< 0.01	0.010	<0.05	< 0.01	< 0.005	<0.002	< 0.002	< 0.002	0.005
MW-52A	Lead	mg/L	*0.01*	< 0.005	<0.005	< 0.005	<0.004	<0.002	< 0.002	0.010	<0.005	0.009	0.007	0.010
MW-52A	Selenium	mg/L	*0.1*	< 0.05	<0.05	<0.05	<0.05	<0.05	<0.05	< 0.005	0.0110	< 0.005	< 0.005	0.0050
MW-52A	D. O.	mg/L	na	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-52A	ORP	mV	na	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-52A	pH	S. U.	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-52A	Conductance	µmhos/cm	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-52A	Temperature	°C	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-52A	Turbidity	NTU	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm

nm - Not Measured, ns - Not Sampled, na - Not Analyzed

Table VI.B.3.a - Site H Historical Groundwater Analysis
Alon USA LP - Big Spring Refinery

Well	Analyte	Units	GWPS mg/L	Jan-97	Jul-97	Jan-98	Jul-98	Jan-99	Jul-99	Jan-00	Jul-00	Jan-01	Jan-02	Jul-02
MW-52	Benzene	mg/L	*0.002*	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
MW-52	Toluene	mg/L	*0.002*	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
MW-52	Phenolics	mg/L	*0.015*	<0.01	<0.01	<0.01	<0.005	<0.005	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
MW-52	Arsenic	mg/L	*0.014*	0.0080	0.0080	0.0110	0.0090	0.0110	0.0103	0.0079	0.0118	0.0090	0.0114	0.0291
MW-52	Chromium	mg/L	*0.026*	<0.005	<0.005	<0.005	<0.002	<0.005	<0.005	<0.005	<0.005	0.006	<0.005	<0.005
MW-52	Lead	mg/L	*0.01*	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
MW-52	Selenium	mg/L	*0.1*	0.0130	0.0120	0.0150	0.0100	0.0150	0.0139	0.0140	0.0123	0.0170	0.0150	0.0247
MW-52	D. O.	mg/L	na	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-52	ORP	mV	na	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-52	pH	S. U.	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-52	Conductance	µmhos/cm	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-52	Temperature	°C	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-52	Turbidity	NTU	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-52A	Benzene	mg/L	*0.002*	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
MW-52A	Toluene	mg/L	*0.002*	<0.001	<0.001	<0.001	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
MW-52A	Phenolics	mg/L	*0.015*	<0.01	<0.01	<0.01	<0.005	<0.01	<0.01	<0.01	<0.01	<0.005	<0.01	<0.01
MW-52A	Arsenic	mg/L	*0.014*	0.0090	0.0090	0.0090	<0.005	0.0110	0.0109	0.0103	0.0104	0.0150	0.0130	0.0180
MW-52A	Chromium	mg/L	*0.026*	<0.005	<0.005	<0.005	<0.002	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
MW-52A	Lead	mg/L	*0.01*	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
MW-52A	Selenium	mg/L	*0.1*	0.0110	0.0100	0.0100	0.0100	0.0080	0.0070	0.0054	0.0071	0.0060	<0.005	0.0098
MW-52A	D. O.	mg/L	na	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-52A	ORP	mV	na	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-52A	pH	S. U.	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-52A	Conductance	µmhos/cm	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-52A	Temperature	°C	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-52A	Turbidity	NTU	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm

nm - Not Measured, ns - Not Sampled, na - Not Analyzed

Table VI.B.3.a - Site H Historical Groundwater Analysis
Alon USA LP - Big Spring Refinery

Well	Analyte	Units	GWPS mg/L	Jan-03	Jul-03	Jul-04	Jul-05	Jul-06	Jul-07	Jul-08	Jul-09	Jul-10	Jul-11	Jul-12
MW-52	Benzene	mg/L	*0.002*	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.00025	<0.001
MW-52	Toluene	mg/L	*0.002*	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.00026	<0.001
MW-52	Phenolics	mg/L	*0.015*	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.005	<0.005	<0.024	<0.05
MW-52	Arsenic	mg/L	*0.014*	0.0129	0.0064	0.00934	0.00975	0.00916	0.00953	<0.005	0.00727	0.0075	0.0076	0.0070
MW-52	Chromium	mg/L	*0.026*	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.0038	<0.01
MW-52	Lead	mg/L	*0.01*	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.0102	0.0024	0.004
MW-52	Selenium	mg/L	*0.1*	0.0113	0.0115	0.0167	0.00931	0.0171	0.00534	<0.005	0.0162	0.019	0.0209	0.0194
MW-52	D. O.	mg/L	na	nm	nm	nm	nm	nm	nm	nm	nm	nm	10.6	5.8
MW-52	ORP	mV	na	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	163.0
MW-52	pH	S. U.	*na*	nm	nm	nm	nm	nm	nm	nm	nm	7.11	6.85	7.82
MW-52	Conductance	µmhos/cm	*na*	nm	nm	nm	nm	nm	nm	nm	nm	969	1,220	1,220
MW-52	Temperature	°C	*na*	nm	nm	nm	nm	nm	nm	nm	nm	26.8	22.8	21.5
MW-52	Turbidity	NTU	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	24.4	3.1
MW-52A	Benzene	mg/L	*0.002*	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.00025	<0.001
MW-52A	Toluene	mg/L	*0.002*	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.00026	<0.001
MW-52A	Phenolics	mg/L	*0.015*	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.005	<0.005	<0.024	<0.05
MW-52A	Arsenic	mg/L	*0.014*	0.0120	0.0090	0.0118	0.0102	0.0124	0.0124	<0.005	0.00844	0.0083	0.0091	0.0101
MW-52A	Chromium	mg/L	*0.026*	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.00844	<0.005	<0.0019	<0.01
MW-52A	Lead	mg/L	*0.01*	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.01	<0.0017	0.007
MW-52A	Selenium	mg/L	*0.1*	<0.005	0.0085	<0.005	<0.005	0.00599	<0.005	<0.005	0.0114	<0.01	0.0091	0.0184
MW-52A	D. O.	mg/L	na	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	5.8
MW-52A	ORP	mV	na	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	140.0
MW-52A	pH	S. U.	*na*	nm	nm	nm	nm	nm	nm	nm	nm	7.34	7.84	5.78
MW-52A	Conductance	µmhos/cm	*na*	nm	nm	nm	nm	nm	nm	nm	nm	674	860	844
MW-52A	Temperature	°C	*na*	nm	nm	nm	nm	nm	nm	nm	nm	30.4	21.8	21.8
MW-52A	Turbidity	NTU	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	4.2	0.0

nm - Not Measured, ns - Not Sampled, na - Not Analyzed

Table VI.B.3.a - Site H Historical Groundwater Analysis
Alon USA LP - Big Spring Refinery

Well	Analyte	Units	GWPS mg/L	Jul-13	Jul-14	Jul-15	Jul-16	Jul-17	Jul-18	Jul-19	Jul-20	Jul-21	Jul-22	Jul-23
MW-52	Benzene	mg/L	*0.002*	<0.001	<0.001	<0.001	<0.00047	0.00047J	<0.00040	<0.0004	<0.001	<0.0003	<0.00023	
MW-52	Toluene	mg/L	*0.002*	<0.001	<0.001	<0.001	<0.00049	0.00092J	<0.00042	<0.00042	<0.001	<0.0003	<0.00023	
MW-52	Phenolics	mg/L	*0.015*	<0.05	<0.016	<0.016	<0.050	<0.050	<0.050	<0.050	0.006	<0.050	0.0062	
MW-52	Arsenic	mg/L	*0.014*	0.0078	0.0067	0.0064	0.0085	0.0074	0.0069	0.0082	0.0068	0.0071	0.0079	
MW-52	Chromium	mg/L	*0.026*	0.003	0.0026 J	<0.010	0.0274	0.0181	0.0053	0.0196	0.004	0.0033	0.0056	
MW-52	Lead	mg/L	*0.01*	0.004	0.0025 J	0.0097	0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0036	
MW-52	Selenium	mg/L	*0.1*	0.0275	0.0289	0.0318	0.0598	0.0323	0.0331	0.0332	0.0339	0.0378	0.0351	
MW-52	D. O.	mg/L	na	5.7	7.0	3.2	3.0	2.6	4.2	3.1	3.6	5.8	6.2	
MW-52	ORP	mV	na	193.0	155.0	145.0	131.7	76.0	138.2	69.6	92.7	46.6	117.5	
MW-52	pH	S. U.	*na*	7.14	6.91	8.45	6.88	6.71	6.82	7.16	7.05	6.90	6.93	
MW-52	Conductance	µmhos/cm	*na*	1,160	1,060	1,150	1,049	1,319	1,388	1,220	1,310	1,215	1,239	
MW-52	Temperature	°C	*na*	21.2	28.9	27.3	23.1	22.2	22.4	23.8	21.8	29.4	22.6	
MW-52	Turbidity	NTU	*na*	5.5	29.9	0.9	4.2	9.1	8.0	26.2	4.1	5.1	6.1	
MW-52A	Benzene	mg/L	*0.002*	<0.001	<0.001	<0.001	<0.00047	0.00055J	<0.00040	<.00040	<0.001	<0.0003	<0.00023	
MW-52A	Toluene	mg/L	*0.002*	<0.001	<0.001	<0.001	<0.00049	0.001	<0.00042	<.00042	<0.001	<0.0003	<0.00023	
MW-52A	Phenolics	mg/L	*0.015*	<0.05	<0.016	0.0260J	<0.050	<0.050	<0.050	<0.050	<0.006	<0.050	<0.0030	
MW-52A	Arsenic	mg/L	*0.014*	0.0109	0.0101	0.0117	0.0107	0.0095	0.0088	0.0089	0.0086	0.0082	0.0087	
MW-52A	Chromium	mg/L	*0.026*	0.002	0.0021 J	<0.010	0.0039	0.0014	<0.0001	0.0019	0.0012	<0.0001	<0.0027	
MW-52A	Lead	mg/L	*0.01*	0.003	0.0027 J	0.0089	0.0049	<0.001	<0.001	<0.001	<0.001	<0.0001	<0.0036	
MW-52A	Selenium	mg/L	*0.1*	0.0218	0.0234	0.0324	0.0401	0.0318	0.0265	0.0228	0.0267	0.0374	<0.0372	
MW-52A	D. O.	mg/L	na	5.3	2.1	3.0	2.4	2.8	3.7	3.4	3.4	3.1	3.6	
MW-52A	ORP	mV	na	199.0	107.0	132.0	(93.1)	(54.5)	150.3	86.4	104.9	55.1	68.1	
MW-52A	pH	S. U.	*na*	7.31	6.89	8.57	7.08	6.83	7.03	6.90	7.18	6.66	6.80	
MW-52A	Conductance	µmhos/cm	*na*	804	789	614	722	971	1,062	948	1,017	1,110	1,163	
MW-52A	Temperature	°C	*na*	25.1	29.6	27.3	26.0	25.2	23.1	23.5	22.7	29.7	22.7	
MW-52A	Turbidity	NTU	*na*	15.6	0.0	0.0	1.2	3.6	7.6	7.0	6.2	6.1	7.2	

nm - Not Measured, ns - Not Sampled, na - Not Analyzed

Table VI.B.3.a - Site H Historical Groundwater Analysis
Alon USA LP - Big Spring Refinery

Well	Analyte	Units	GWPS mg/L	Jul-92	Oct-92	Jan-93	Apr-93	Jul-93	Jan-94	Jul-94	Jan-95	Jul-95	Jan-96	Jul-96
MW-53	Benzene	mg/L	*0.002*	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MW-53	Toluene	mg/L	*0.002*	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MW-53	Phenolics	mg/L	*0.015*	0.002	<0.005	< 0.005	0.020	0.013	< 0.0	< 0.01	<0.01	< 0.01	< 0.01	< 0.01
MW-53	Arsenic	mg/L	*0.014*	0.0070	0.0090	0.0080	0.0150	< 0.005	< 0.005	0.0080	0.0070	0.0100	0.0080	0.0100
MW-53	Chromium	mg/L	*0.026*	<0.005	0.007	< 0.01	< 0.01	<0.05	< 0.01	< 0.005	< 0.005	< 0.002	0.003	0.005
MW-53	Lead	mg/L	*0.01*	< 0.005	<0.005	< 0.005	<0.004	< 0.002	< 0.002	0.030	<0.005	0.022	0.023	0.030
MW-53	Selenium	mg/L	*0.1*	<0.05	0.0500	<0.05	<0.05	<0.05	<0.05	< 0.005	0.0230	< 0.005	< 0.005	0.0050
MW-53	D. O.	mg/L	na	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-53	ORP	mV	na	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-53	pH	S. U.	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-53	Conductance	µmhos/cm	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-53	Temperature	°C	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-53	Turbidity	NTU	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-53A	Benzene	mg/L	*0.002*	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MW-53A	Toluene	mg/L	*0.002*	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MW-53A	Phenolics	mg/L	*0.015*	0.002	<0.005	< 0.005	0.010	< 0.005	< 0.01	< 0.01	< 0.01	0.020	< 0.01	< 0.01
MW-53A	Arsenic	mg/L	*0.014*	0.0080	0.0090	0.0090	0.0200	0.0110	0.0130	0.0100	0.0090	0.0100	0.0100	0.0130
MW-53A	Chromium	mg/L	*0.026*	< 0.005	0.009	< 0.01	0.010	<0.05	< 0.01	< 0.005	< 0.005	< 0.002	< 0.002	0.005
MW-53A	Lead	mg/L	*0.01*	< 0.005	<0.005	< 0.005	<0.004	< 0.002	< 0.002	0.025	<0.005	0.021	0.022	0.028
MW-53A	Selenium	mg/L	*0.1*	< 0.05	<0.05	<0.05	<0.05	<0.05	<0.05	< 0.005	0.0220	< 0.005	< 0.005	0.0050
MW-53A	D. O.	mg/L	na	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-53A	ORP	mV	na	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-53A	pH	S. U.	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-53A	Conductance	µmhos/cm	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-53A	Temperature	°C	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-53A	Turbidity	NTU	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm

nm - Not Measured, ns - Not Sampled, na - Not Analyzed

Table VI.B.3.a - Site H Historical Groundwater Analysis
Alon USA LP - Big Spring Refinery

Well	Analyte	Units	GWPS mg/L	Jan-97	Jul-97	Jan-98	Jul-98	Jan-99	Jul-99	Jan-00	Jul-00	Jan-01	Jan-02	Jul-02
MW-53	Benzene	mg/L	*0.002*	<0.001	<0.001	<0.001	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
MW-53	Toluene	mg/L	*0.002*	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
MW-53	Phenolics	mg/L	*0.015*	<0.01	<0.01	<0.01	<0.005	<0.01	<0.01	<0.01	<0.01	<0.005	<0.01	<0.01
MW-53	Arsenic	mg/L	*0.014*	0.0090	0.0080	0.0090	0.0080	0.0110	0.0140	0.0079	0.0102	0.0120	<0.005	0.0333
MW-53	Chromium	mg/L	*0.026*	<0.005	<0.005	<0.005	<0.002	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
MW-53	Lead	mg/L	*0.01*	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
MW-53	Selenium	mg/L	*0.1*	0.0310	0.0240	0.0150	0.0100	0.0190	0.0172	0.0200	0.0138	0.0140	0.0148	0.0154
MW-53	D. O.	mg/L	na	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-53	ORP	mV	na	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-53	pH	S. U.	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-53	Conductance	µmhos/cm	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-53	Temperature	°C	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-53	Turbidity	NTU	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-53A	Benzene	mg/L	*0.002*	<0.001	<0.001	<0.001	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
MW-53A	Toluene	mg/L	*0.002*	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
MW-53A	Phenolics	mg/L	*0.015*	<0.01	<0.01	<0.01	<0.005	<0.01	<0.01	<0.01	<0.01	<0.005	<0.01	<0.01
MW-53A	Arsenic	mg/L	*0.014*	0.0100	0.0090	0.0120	0.0070	0.0100	0.0105	0.0110	0.0140	0.0100	0.0103	0.0140
MW-53A	Chromium	mg/L	*0.026*	<0.005	<0.005	<0.005	<0.002	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
MW-53A	Lead	mg/L	*0.01*	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
MW-53A	Selenium	mg/L	*0.1*	0.0260	0.0240	0.0100	0.0110	0.0170	0.0217	0.0117	0.0140	0.0100	0.0097	0.0169
MW-53A	D. O.	mg/L	na	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-53A	ORP	mV	na	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-53A	pH	S. U.	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-53A	Conductance	µmhos/cm	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-53A	Temperature	°C	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-53A	Turbidity	NTU	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm

nm - Not Measured, ns - Not Sampled, na - Not Analyzed

Table VI.B.3.a - Site H Historical Groundwater Analysis
Alon USA LP - Big Spring Refinery

Well	Analyte	Units	GWPS mg/L	Jan-03	Jul-03	Jul-04	Jul-05	Jul-06	Jul-07	Jul-08	Jul-09	Jul-10	Jul-11	Jul-12
MW-53	Benzene	mg/L	*0.002*	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.00025	<0.001
MW-53	Toluene	mg/L	*0.002*	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.00026	<0.001
MW-53	Phenolics	mg/L	*0.015*	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.005	<0.005	<0.024	<0.05
MW-53	Arsenic	mg/L	*0.014*	0.0086	0.0077	0.011	0.0114	0.0113	0.0116	<0.005	0.00897	0.0106	0.0116	0.0119
MW-53	Chromium	mg/L	*0.026*	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0019	<0.01
MW-53	Lead	mg/L	*0.01*	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.012	0.0025	0.006
MW-53	Selenium	mg/L	*0.1*	0.0193	0.0369	0.0128	0.0144	0.0178	0.0117	<0.005	0.00978	0.0133	0.0142	0.0110
MW-53	D. O.	mg/L	na	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	6.7
MW-53	ORP	mV	na	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	129.0
MW-53	pH	S. U.	*na*	nm	nm	nm	nm	nm	nm	nm	nm	7.30	7.99	7.63
MW-53	Conductance	µmhos/cm	*na*	nm	nm	nm	nm	nm	nm	nm	nm	848	1,000	934
MW-53	Temperature	°C	*na*	nm	nm	nm	nm	nm	nm	nm	nm	29.9	31.3	22.6
MW-53	Turbidity	NTU	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	0.0	0.0
MW-53A	Benzene	mg/L	*0.002*	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.00025	<0.01
MW-53A	Toluene	mg/L	*0.002*	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.00026	<0.01
MW-53A	Phenolics	mg/L	*0.015*	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.0107	<0.005	<0.005	<0.024	<0.05
MW-53A	Arsenic	mg/L	*0.014*	0.0148	0.0085	0.0122	0.0117	0.0122	0.0124	0.0119	0.0117	0.0112	0.0102	0.0107
MW-53A	Chromium	mg/L	*0.026*	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0019	<0.01
MW-53A	Lead	mg/L	*0.01*	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0017	0.008
MW-53A	Selenium	mg/L	*0.1*	0.0212	0.0251	0.00739	0.0171	0.0191	0.0119	0.00976	0.0106	0.00924	0.0102	0.0142
MW-53A	D. O.	mg/L	na	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	6.7
MW-53A	ORP	mV	na	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	136.0
MW-53A	pH	S. U.	*na*	nm	nm	nm	nm	nm	nm	nm	nm	7.12	8.02	7.61
MW-53A	Conductance	µmhos/cm	*na*	nm	nm	nm	nm	nm	nm	nm	nm	900	940	1,100
MW-53A	Temperature	°C	*na*	nm	nm	nm	nm	nm	nm	nm	nm	24.4	26.2	22.6
MW-53A	Turbidity	NTU	*na*	nm	nm	nm	nm	nm	nm	nm	nm	0.0	0.0	22.5

nm - Not Measured, ns - Not Sampled, na - Not Analyzed

Table VI.B.3.a - Site H Historical Groundwater Analysis
Alon USA LP - Big Spring Refinery

Well	Analyte	Units	GWPS mg/L	Jul-13	Jul-14	Jul-15	Jul-16	Jul-17	Jul-18	Jul-19	Jul-20	Jul-21	Jul-22	Jul-23
MW-53	Benzene	mg/L	*0.002*	<0.001	<0.001	<0.001	<0.00047	0.00035J	<0.00040	<0.00040	<0.001	<0.0003	<0.00023	
MW-53	Toluene	mg/L	*0.002*	<0.001	<0.001	<0.001	<0.00049	0.00079J	<0.00042	<0.00042	<0.001	<0.0003	<0.00023	
MW-53	Phenolics	mg/L	*0.015*	<0.05	<0.016	<0.016	<0.050	<0.050	<0.050	<0.050	<0.006	<0.050	0.016	
MW-53	Arsenic	mg/L	*0.014*	0.0132	0.0122	0.0144	0.0099	0.0118	0.0104	0.0107	0.0098	0.0098	0.0105	
MW-53	Chromium	mg/L	*0.026*	0.002	0.0017 J	<0.010	0.0052	0.0018	0.0013	0.0024	0.0016	0.015	<0.0027	
MW-53	Lead	mg/L	*0.01*	0.002	0.003	0.0083	0.0058	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0036	
MW-53	Selenium	mg/L	*0.1*	0.0144	0.0183	0.0145	0.0214	0.0078	0.0074	0.0088	0.0078	0.011	<0.014	
MW-53	D. O.	mg/L	na	7.1	6.2	3.6	3.2	4.5	4.4	4.5	4.9	4.9	5.2	
MW-53	ORP	mV	na	199.0	162.0	224.0	72.9	(45.2)	(75.0)	69.6	70.8	67.3	58.4	
MW-53	pH	S. U.	*na*	7.19	6.85	7.44	7.31	7.06	7.28	7.25	7.29	7.27	7.19	
MW-53	Conductance	µmhos/cm	*na*	874	1,130	641	796	795	754	706	736	857	773	
MW-53	Temperature	°C	*na*	21.8	29.8	24.4	28.3	22.3	22.9	24.7	22.8	23.9	23.0	
MW-53	Turbidity	NTU	*na*	2.3	82.4	0.0	8.0	7.9	2.3	2.4	3.3	4.3	5.5	
MW-53A	Benzene	mg/L	*0.002*	<0.001	<0.001	<0.001	<0.00047	0.0003J	<0.00040	<0.0004	<0.001	<0.0003	<0.00023	
MW-53A	Toluene	mg/L	*0.002*	<0.001	<0.001	<0.001	<0.00049	<0.0003	<0.00042	<0.00042	<0.001	<0.0003	<0.00023	
MW-53A	Phenolics	mg/L	*0.015*	<0.05	<0.016	<0.016	<0.050	<0.050	<0.050	<0.050	<0.006	<0.050	<0.0030	
MW-53A	Arsenic	mg/L	*0.014*	0.0131	0.0126	0.0139	0.0149	0.0127	0.0107	0.0105	0.0101	0.0101	0.0107	
MW-53A	Chromium	mg/L	*0.026*	0.002	0.0021 J	<0.010	0.0037	0.0011	0.001	0.0013	0.0011	<0.001	<0.0027	
MW-53A	Lead	mg/L	*0.01*	0.004	0.0029 J	0.009	0.0043	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0036	
MW-53A	Selenium	mg/L	*0.1*	0.0191	0.0155	0.0122	0.0145	<0.005	0.0062	<0.005	0.0074	0.0079	<0.014	
MW-53A	D. O.	mg/L	na	6.5	6.6	5.6	5.4	5.1	5.3	4.2	3.7	4.7	5.3	
MW-53A	ORP	mV	na	276.0	148.0	243.0	145.9	69.9	74.8	63.4	92.7	102.1	66.7	
MW-53A	pH	S. U.	*na*	6.98	7.13	7.29	7.26	6.98	7.33	7.36	7.40	7.13	6.83	
MW-53A	Conductance	µmhos/cm	*na*	1,210	792	599	716	706	697	716	641	770	879	
MW-53A	Temperature	°C	*na*	20.4	25.0	23.7	24.0	22.0	22.8	22.2	22.1	21.7	23.0	
MW-53A	Turbidity	NTU	*na*	0.0	0.0	0.0	4.5	2.7	3.5	3.3	3.1	5.8	5.3	

nm - Not Measured, ns - Not Sampled, na - Not Analyzed

Table VI.B.3.a - Site H Historical Groundwater Analysis
Alon USA LP - Big Spring Refinery

Well	Analyte	Units	GWPS mg/L	Jul-92	Oct-92	Jan-93	Apr-93	Jul-93	Jan-94	Jul-94	Jan-95	Jul-95	Jan-96	Jul-96
MW-54	Benzene	mg/L	*0.002*	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MW-54	Toluene	mg/L	*0.002*	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MW-54	Phenolics	mg/L	*0.015*	0.030	<0.005	< 0.005	0.020	< 0.005	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
MW-54	Arsenic	mg/L	*0.014*	0.0060	<0.005	< 0.005	0.0130	< 0.005	< 0.005	< 0.005	< 0.005	0.0060	0.0080	0.0090
MW-54	Chromium	mg/L	*0.026*	< 0.005	0.005	< 0.01	< 0.01	<0.05	< 0.01	< 0.005	< 0.005	< 0.002	< 0.002	0.005
MW-54	Lead	mg/L	*0.01*	< 0.005	<0.005	< 0.005	<0.004	< 0.002	< 0.002	< 0.005	< 0.005	0.006	0.007	0.017
MW-54	Selenium	mg/L	*0.1*	< 0.05	0.0500	<0.05	<0.05	<0.05	<0.05	< 0.005	< 0.005	< 0.005	< 0.005	0.0050
MW-54	D. O.	mg/L	na	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-54	ORP	mV	na	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-54	pH	S. U.	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-54	Conductance	µmhos/cm	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-54	Temperature	°C	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-54	Turbidity	NTU	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-54A	Benzene	mg/L	*0.002*	< 1.0	< 1.0	< 1.0	< 1.0	<1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MW-54A	Toluene	mg/L	*0.002*	< 1.0	< 1.0	< 1.0	< 1.0	<1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MW-54A	Phenolics	mg/L	*0.015*	< 0.001	<0.005	< 0.005	0.010	<0.005	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
MW-54A	Arsenic	mg/L	*0.014*	< 0.005	<0.005	0.0060	0.0080	0.0050	< 0.005	< 0.005	0.0050	< 0.005	< 0.005	0.0080
MW-54A	Chromium	mg/L	*0.026*	< 0.005	0.005	< 0.01	0.010	<0.05	< 0.01	< 0.005	< 0.005	< 0.002	< 0.002	0.005
MW-54A	Lead	mg/L	*0.01*	< 0.005	<0.005	< 0.005	<0.004	<0.002	< 0.002	0.018	0.018	0.015	0.017	0.021
MW-54A	Selenium	mg/L	*0.1*	< 0.05	<0.05	<0.05	<0.05	<0.05	<0.05	< 0.005	0.0190	< 0.005	< 0.005	0.0050
MW-54A	D. O.	mg/L	na	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-54A	ORP	mV	na	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-54A	pH	S. U.	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-54A	Conductance	µmhos/cm	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-54A	Temperature	°C	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-54A	Turbidity	NTU	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm

nm - Not Measured, ns - Not Sampled, na - Not Analyzed

Table VI.B.3.a - Site H Historical Groundwater Analysis
Alon USA LP - Big Spring Refinery

Well	Analyte	Units	GWPS mg/L	Jan-97	Jul-97	Jan-98	Jul-98	Jan-99	Jul-99	Jan-00	Jul-00	Jan-01	Jan-02	Jul-02
MW-54	Benzene	mg/L	*0.002*	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
MW-54	Toluene	mg/L	*0.002*	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
MW-54	Phenolics	mg/L	*0.015*	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.005	<0.01	<0.01
MW-54	Arsenic	mg/L	*0.014*	0.0060	0.0060	0.0080	0.0080	0.0120	0.0144	0.0079	0.0122	0.0110	0.0105	0.0343
MW-54	Chromium	mg/L	*0.026*	<0.005	<0.005	<0.005	<0.002	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
MW-54	Lead	mg/L	*0.01*	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
MW-54	Selenium	mg/L	*0.1*	0.0140	0.0140	0.0070	0.0120	0.0140	0.0208	0.0139	0.0190	0.0210	0.0313	0.0432
MW-54	D. O.	mg/L	na	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-54	ORP	mV	na	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-54	pH	S. U.	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-54	Conductance	µmhos/cm	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-54	Temperature	°C	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-54	Turbidity	NTU	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-54A	Benzene	mg/L	*0.002*	<0.001	<0.001	<0.001	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
MW-54A	Toluene	mg/L	*0.002*	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
MW-54A	Phenolics	mg/L	*0.015*	<0.01	<0.01	<0.01	<0.005	<0.01	<0.01	<0.01	<0.01	<0.005	<0.01	<0.01
MW-54A	Arsenic	mg/L	*0.014*	<0.005	<0.005	<0.005	0.0090	<0.005	0.0080	<0.005	0.0052	0.0070	0.0058	0.0106
MW-54A	Chromium	mg/L	*0.026*	<0.005	<0.005	<0.005	0.002	0.006	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
MW-54A	Lead	mg/L	*0.01*	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
MW-54A	Selenium	mg/L	*0.1*	0.0210	0.0180	0.0200	0.0060	0.0280	0.0352	0.0280	0.0343	0.0390	0.0343	0.0387
MW-54A	D. O.	mg/L	na	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-54A	ORP	mV	na	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-54A	pH	S. U.	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-54A	Conductance	µmhos/cm	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-54A	Temperature	°C	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-54A	Turbidity	NTU	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm

nm - Not Measured, ns - Not Sampled, na - Not Analyzed

Table VI.B.3.a - Site H Historical Groundwater Analysis
Alon USA LP - Big Spring Refinery

Well	Analyte	Units	GWPS mg/L	Jan-03	Jul-03	Jul-04	Jul-05	Jul-06	Jul-07	Jul-08	Jul-09	Jul-10	Jul-11	Jul-12
MW-54	Benzene	mg/L	*0.002*	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.00025	<0.001
MW-54	Toluene	mg/L	*0.002*	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.00026	<0.001
MW-54	Phenolics	mg/L	*0.015*	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.005	<0.005	<0.024	<0.05
MW-54	Arsenic	mg/L	*0.014*	0.0148	0.0073	0.0105	0.00723	0.00497	0.0104	0.00987	0.00995	0.0105	0.0115	0.0106
MW-54	Chromium	mg/L	*0.026*	<0.005	<0.005	<0.005	<0.005	0.00613	<0.005	<0.005	<0.005	<0.005	<0.0019	<0.01
MW-54	Lead	mg/L	*0.01*	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.0025	0.007
MW-54	Selenium	mg/L	*0.1*	0.0354	0.0439	0.0239	0.0247	0.023	0.0143	0.0128	0.0146	0.0105	0.0093	0.0090
MW-54	D. O.	mg/L	na	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	8.0
MW-54	ORP	mV	na	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	164.0
MW-54	pH	S. U.	*na*	nm	nm	nm	nm	nm	nm	nm	nm	7.27	6.53	7.84
MW-54	Conductance	µmhos/cm	*na*	nm	nm	nm	nm	nm	nm	nm	nm	900	937	1,000
MW-54	Temperature	°C	*na*	nm	nm	nm	nm	nm	nm	nm	nm	21.3	26.2	20.9
MW-54	Turbidity	NTU	*na*	nm	nm	nm	nm	nm	nm	nm	nm	5.5	0.2	0.7
MW-54A	Benzene	mg/L	*0.002*	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.00025	<0.001
MW-54A	Toluene	mg/L	*0.002*	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.00026	<0.001
MW-54A	Phenolics	mg/L	*0.015*	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.005	<0.005	<0.024	0.060
MW-54A	Arsenic	mg/L	*0.014*	<0.005	0.0047	0.0064	0.00451	0.01	0.00887	0.00693	0.00744	0.00716	0.007	0.0083
MW-54A	Chromium	mg/L	*0.026*	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0019	<0.01
MW-54A	Lead	mg/L	*0.01*	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0017	0.008
MW-54A	Selenium	mg/L	*0.1*	0.0413	0.0493	0.0282	0.0322	0.0195	0.0197	0.0143	0.0188	0.0131	0.0156	0.0127
MW-54A	D. O.	mg/L	na	nm	nm	nm	nm	nm	nm	nm	nm	nm	7.5	6.2
MW-54A	ORP	mV	na	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	155.0
MW-54A	pH	S. U.	*na*	nm	nm	nm	nm	nm	nm	nm	nm	7.12	5.93	0.06
MW-54A	Conductance	µmhos/cm	*na*	nm	nm	nm	nm	nm	nm	nm	nm	1,120	1,070	986
MW-54A	Temperature	°C	*na*	nm	nm	nm	nm	nm	nm	nm	nm	22.0	25.1	20.8
MW-54A	Turbidity	NTU	*na*	nm	nm	nm	nm	nm	nm	nm	nm	0.0	9.8	0.8

nm - Not Measured, ns - Not Sampled, na - Not Analyzed

Table VI.B.3.a - Site H Historical Groundwater Analysis
Alon USA LP - Big Spring Refinery

Well	Analyte	Units	GWPS mg/L	Jul-13	Jul-14	Jul-15	Jul-16	Jul-17	Jul-18	Jul-19	Jul-20	Jul-21	Jul-22	Jul-23
MW-54	Benzene	mg/L	*0.002*	<0.001	<0.001	<0.001	<0.00047	<0.0003	<0.00040	<0.00040	<0.001	<0.0003	<0.00023	
MW-54	Toluene	mg/L	*0.002*	<0.001	<0.001	<0.001	<0.00049	0.00039J	<0.00042	<0.00042	<0.001	<0.0003	<0.00023	
MW-54	Phenolics	mg/L	*0.015*	<0.05	0.017 J	<0.016	<0.050	<0.050	<0.050	<0.050	<0.006	<0.050	0.02	
MW-54	Arsenic	mg/L	*0.014*	0.0123	0.0118	0.0117	<0.005	0.0057	0.0053	0.0045	0.0042	0.0042	0.0040 J	
MW-54	Chromium	mg/L	*0.026*	0.002	0.0013 J	<0.010	0.0043	0.0045	0.0028	0.0265	0.0046	0.0059	0.0043 J	
MW-54	Lead	mg/L	*0.01*	0.004	0.0036	0.0105	0.0079	0.0014	0.0014	0.0175	0.0026	0.004	0.0038 J	
MW-54	Selenium	mg/L	*0.1*	0.0080	0.0054	0.0062	0.0316	0.0128	0.0116	0.0149	0.0113	0.0127	<0.014	
MW-54	D. O.	mg/L	na	4.3	13.3	6.7	4.4	5.2	4.8	3.2	4.0	3.4	4.0	
MW-54	ORP	mV	na	271.0	94.0	145.0	135.1	103.7	108.7	102.3	85.6	113.3	67.4	
MW-54	pH	S. U.	*na*	6.82	7.32	9.05	7.02	7.07	7.15	7.38	7.33	7.21	7.15	
MW-54	Conductance	µmhos/cm	*na*	712	583	543	934	835	851	836	745	860	796	
MW-54	Temperature	°C	*na*	20.3	25.1	22.1	22.4	23.2	22.7	25.0	24.3	25.7	22.8	
MW-54	Turbidity	NTU	*na*	0.0	65.9	0.0	3.3	5.3	3.5	7.4	8.9	5.5	5.3	
MW-54A	Benzene	mg/L	*0.002*	<0.001	<0.001	<0.001	<0.00047	<0.0003	<0.00040	<0.00040	<0.001	<0.0003	<0.00023	
MW-54A	Toluene	mg/L	*0.002*	<0.001	<0.001	<0.001	<0.00049	0.00047J	<0.00042	<0.00042	<0.001	<0.0003	<0.00023	
MW-54A	Phenolics	mg/L	*0.015*	<0.05	0.037J	<0.016	<0.050	<0.050	<0.050	<0.050	<0.006	<0.050	0.014	
MW-54A	Arsenic	mg/L	*0.014*	0.0088	0.0077	0.0073	0.0163	0.0101	0.0092	0.0079	0.0085	0.0094	0.0087	
MW-54A	Chromium	mg/L	*0.026*	0.002	0.0037 J	<0.010	0.0048	0.0022	0.0011	0.0016	0.0037	0.0016	<0.0027	
MW-54A	Lead	mg/L	*0.01*	0.003	0.0038	0.0069	0.006	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0036	
MW-54A	Selenium	mg/L	*0.1*	0.0160	0.0114	0.0149	0.0247	0.0069	<0.005	0.0065	<0.005	<0.005	<0.014	
MW-54A	D. O.	mg/L	na	8.3	27.1	3.5	4.7	5.0	4.5	2.7	3.1	3.1	3.9	
MW-54A	ORP	mV	na	271.0	127.0	140.0	144.9	73.7	89.8	90.6	103.4	101.7	103.7	
MW-54A	pH	S. U.	*na*	6.47	7.03	8.24	7.12	7.31	7.30	7.49	7.25	7.23	6.81	
MW-54A	Conductance	µmhos/cm	*na*	1,050	754	747	837	812	687	776	886	850	848	
MW-54A	Temperature	°C	*na*	20.4	23.1	26.0	22.6	23.5	23.5	25.3	29.8	27.5	23.5	
MW-54A	Turbidity	NTU	*na*	0.0	0.0	0.0	8.1	9.4	3.7	3.9	5.7	4.1	6.8	

nm - Not Measured, ns - Not Sampled, na - Not Analyzed

Table VI.B.3.a - Site H Historical Groundwater Analysis
Alon USA LP - Big Spring Refinery

Well	Analyte	Units	GWPS mg/L	Jul-92	Oct-92	Jan-93	Apr-93	Jul-93	Jan-94	Jul-94	Jan-95	Jul-95	Jan-96	Jul-96
MW-74	Benzene	mg/L	*0.002*	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MW-74	Toluene	mg/L	*0.002*	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MW-74	Phenolics	mg/L	*0.015*	0.006	<0.005	0.006	0.020	< 0.005	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
MW-74	Arsenic	mg/L	*0.014*	0.0070	0.0060	0.0080	0.0170	< 0.005	< 0.005	0.0070	0.0080	0.0090	0.0070	0.0090
MW-74	Chromium	mg/L	*0.026*	<0.007	0.014	< 0.01	< 0.01	<0.05	< 0.01	0.123	0.003	0.002	0.003	0.005
MW-74	Lead	mg/L	*0.01*	< 0.005	<0.005	< 0.005	<0.004	< 0.002	< 0.002	0.021	<0.005	0.025	0.039	0.038
MW-74	Selenium	mg/L	*0.1*	< 0.05	0.0500	<0.05	<0.05	<0.05	<0.05	< 0.005	0.0260	< 0.005	< 0.005	0.0050
MW-74	D. O.	mg/L	na	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-74	ORP	mV	na	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-74	pH	S. U.	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-74	Conductance	µmhos/cm	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-74	Temperature	°C	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-74	Turbidity	NTU	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-74A	Benzene	mg/L	*0.002*	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MW-74A	Toluene	mg/L	*0.002*	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MW-74A	Phenolics	mg/L	*0.015*	0.002	<0.005	< 0.005	< 0.01	<0.005	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
MW-74A	Arsenic	mg/L	*0.014*	0.0090	0.0080	0.0100	0.0100	0.0150	< 0.005	0.0080	0.0090	0.0110	0.0090	0.0090
MW-74A	Chromium	mg/L	*0.026*	0.008	0.008	0.030	0.010	<0.05	< 0.01	0.007	0.002	< 0.002	0.015	0.005
MW-74A	Lead	mg/L	*0.01*	< 0.005	<0.005	< 0.005	<0.004	0.004	< 0.002	0.026	<0.005	0.029	0.030	0.034
MW-74A	Selenium	mg/L	*0.1*	< 0.05	<0.05	<0.05	<0.05	<0.05	<0.05	< 0.005	0.0280	< 0.005	< 0.005	0.0050
MW-74A	D. O.	mg/L	na	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-74A	ORP	mV	na	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-74A	pH	S. U.	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-74A	Conductance	µmhos/cm	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-74A	Temperature	°C	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-74A	Turbidity	NTU	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm

nm - Not Measured, ns - Not Sampled, na - Not Analyzed

Table VI.B.3.a - Site H Historical Groundwater Analysis
Alon USA LP - Big Spring Refinery

Well	Analyte	Units	GWPS mg/L	Jan-97	Jul-97	Jan-98	Jul-98	Jan-99	Jul-99	Jan-00	Jul-00	Jan-01	Jan-02	Jul-02
MW-74	Benzene	mg/L	*0.002*	<0.001	<0.001	<0.001	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
MW-74	Toluene	mg/L	*0.002*	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
MW-74	Phenolics	mg/L	*0.015*	<0.01	<0.01	<0.01	<0.005	<0.01	<0.01	<0.01	<0.01	<0.005	<0.01	<0.01
MW-74	Arsenic	mg/L	*0.014*	0.0080	0.0100	0.0090	0.0100	0.0090	0.0119	0.0087	0.0103	0.0140	0.0074	0.0164
MW-74	Chromium	mg/L	*0.026*	<0.005	<0.005	<0.005	0.003	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
MW-74	Lead	mg/L	*0.01*	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
MW-74	Selenium	mg/L	*0.1*	0.0360	0.0370	0.0250	0.0100	0.0260	0.0253	0.0248	0.0256	0.0320	0.0241	0.0204
MW-74	D. O.	mg/L	na	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-74	ORP	mV	na	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-74	pH	S. U.	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-74	Conductance	µmhos/cm	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-74	Temperature	°C	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-74	Turbidity	NTU	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-74A	Benzene	mg/L	*0.002*	<0.001	<0.001	<0.001	<0.001	<0.001	ns	<0.001	<0.001	<0.001	<0.001	<0.001
MW-74A	Toluene	mg/L	*0.002*	<0.001	<0.001	<0.001	0.001	<0.001	ns	<0.001	<0.001	<0.001	<0.001	<0.001
MW-74A	Phenolics	mg/L	*0.015*	<0.01	<0.01	<0.01	<0.005	<0.01	ns	<0.01	<0.01	<0.005	<0.01	<0.01
MW-74A	Arsenic	mg/L	*0.014*	0.0110	0.0100	0.0100	0.0120	0.0120	ns	0.0106	0.0113	0.0130	0.0121	0.0250
MW-74A	Chromium	mg/L	*0.026*	<0.005	<0.005	<0.005	<0.002	<0.005	ns	<0.005	<0.005	<0.005	<0.005	<0.005
MW-74A	Lead	mg/L	*0.01*	<0.005	<0.005	<0.005	<0.005	<0.005	ns	<0.005	<0.005	<0.005	<0.005	<0.005
MW-74A	Selenium	mg/L	*0.1*	0.0330	0.0310	0.0280	0.0120	0.0320	ns	0.0293	0.0263	0.0270	0.0218	0.0255
MW-74A	D. O.	mg/L	na	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-74A	ORP	mV	na	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-74A	pH	S. U.	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-74A	Conductance	µmhos/cm	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-74A	Temperature	°C	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-74A	Turbidity	NTU	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm

nm - Not Measured, ns - Not Sampled, na - Not Analyzed

Table VI.B.3.a - Site H Historical Groundwater Analysis
Alon USA LP - Big Spring Refinery

Well	Analyte	Units	GWPS mg/L	Jan-03	Jul-03	Jul-04	Jul-05	Jul-06	Jul-07	Jul-08	Jul-09	Jul-10	Jul-11	Jul-12
MW-74	Benzene	mg/L	*0.002*	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.00025	<0.001
MW-74	Toluene	mg/L	*0.002*	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.00026	<0.001
MW-74	Phenolics	mg/L	*0.015*	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.005	<0.005	<0.024	<0.05
MW-74	Arsenic	mg/L	*0.014*	0.0119	0.0061	0.0101	0.0132	0.0106	0.0101	0.00921	0.00871	0.00992	0.0101	0.0100
MW-74	Chromium	mg/L	*0.026*	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.019	<0.01
MW-74	Lead	mg/L	*0.01*	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.0114	0.006
MW-74	Selenium	mg/L	*0.1*	0.0243	0.0321	0.0156	0.0125	0.0131	0.00988	0.012	0.0131	0.0091	0.0161	0.0087
MW-74	D. O.	mg/L	na	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	7.7
MW-74	ORP	mV	na	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	170.0
MW-74	pH	S. U.	*na*	nm	nm	nm	nm	nm	nm	nm	nm	6.97	6.96	7.51
MW-74	Conductance	µmhos/cm	*na*	nm	nm	nm	nm	nm	nm	nm	nm	1,120	1,200	984
MW-74	Temperature	°C	*na*	nm	nm	nm	nm	nm	nm	nm	nm	23.0	23.6	23.0
MW-74	Turbidity	NTU	*na*	nm	nm	nm	nm	nm	nm	nm	nm	0.0	8.9	22.9
MW-74A	Benzene	mg/L	*0.002*	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.00025	<0.001
MW-74A	Toluene	mg/L	*0.002*	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.00026	<0.001
MW-74A	Phenolics	mg/L	*0.015*	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.012	<0.005	<0.005	<0.024	<0.050
MW-74A	Arsenic	mg/L	*0.014*	0.0159	0.0104	0.014	0.0147	0.014	0.0142	0.0128	0.0130	0.0128	0.0147	0.0145
MW-74A	Chromium	mg/L	*0.026*	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.0035	<0.01
MW-74A	Lead	mg/L	*0.01*	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0017	0.007
MW-74A	Selenium	mg/L	*0.1*	0.0240	0.0287	0.018	0.0168	0.0171	0.0113	0.00981	0.00859	0.00747	0.0098	0.0063
MW-74A	D. O.	mg/L	na	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	5.8
MW-74A	ORP	mV	na	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	174.0
MW-74A	pH	S. U.	*na*	nm	nm	nm	nm	nm	nm	nm	nm	7.18	7.86	7.57
MW-74A	Conductance	µmhos/cm	*na*	nm	nm	nm	nm	nm	nm	nm	nm	947	890	809
MW-74A	Temperature	°C	*na*	nm	nm	nm	nm	nm	nm	nm	nm	24.2	24.8	25.7
MW-74A	Turbidity	NTU	*na*	nm	nm	nm	nm	nm	nm	nm	nm	0.0	7.8	0.0

nm - Not Measured, ns - Not Sampled, na - Not Analyzed

Table VI.B.3.a - Site H Historical Groundwater Analysis
Alon USA LP - Big Spring Refinery

Well	Analyte	Units	GWPS mg/L	Jul-13	Jul-14	Jul-15	Jul-16	Jul-17	Jul-18	Jul-19	Jul-20	Jul-21	Jul-22	Jul-23
MW-74	Benzene	mg/L	*0.002*	<0.001	<0.001	<0.001	<0.00047	<0.0003	<0.00040	<0.00040	<0.001	<0.0003	<0.00023	
MW-74	Toluene	mg/L	*0.002*	<0.001	<0.001	<0.001	<0.00049	0.00044J	<0.00042	<0.00042	<0.001	<0.0003	<0.00023	
MW-74	Phenolics	mg/L	*0.015*	<0.05	0.031 J	<0.016	<0.050	<0.050	<0.050	<0.050	<0.006	<0.050	0.028	
MW-74	Arsenic	mg/L	*0.014*	0.0099	0.0094	0.0133	0.013	0.012	0.0108	0.0153	0.0097	0.0086	0.0111	
MW-74	Chromium	mg/L	*0.026*	0.002	0.0034 J	<0.010	0.0037	0.0045	0.0424	0.278	0.0272	0.0096	0.022	
MW-74	Lead	mg/L	*0.01*	0.003	0.0046	0.0074	0.005	<0.001	<0.001	0.0025	<0.001	<0.001	<0.0036	
MW-74	Selenium	mg/L	*0.1*	0.0111	0.0151	0.0158	0.0202	0.0175	0.0119	0.0136	0.0129	0.0085	<0.014	
MW-74	D. O.	mg/L	na	6.7	13.5	2.6	4.6	4.4	4.1	2.9	3.1	3.3	4.0	
MW-74	ORP	mV	na	238.0	88.0	(32.0)	144.5	22.8	30.0	91.3	78.3	18.1	60.9	
MW-74	pH	S. U.	*na*	6.98	7.17	7.84	7.08	6.81	7.17	7.24	7.46	7.23	7.02	
MW-74	Conductance	µmhos/cm	*na*	1,080	868	629	815	1,038	906	915	747	796	748	
MW-74	Temperature	°C	*na*	20.7	23.4	22.3	23.0	21.9	23.1	24.0	25.3	23.5	22.0	
MW-74	Turbidity	NTU	*na*	0.0	62.1	0.0	4.6	7.5	5.3	8.9	7.2	5.3	5.7	
MW-74A	Benzene	mg/L	*0.002*	<0.001	<0.001	<0.001	<0.00047	<0.0003	<0.00040	<0.00040	<0.001	<0.0003	<0.00023	
MW-74A	Toluene	mg/L	*0.002*	<0.001	<0.001	<0.001	<0.00049	0.00048J	<0.00042	<0.00042	<0.001	<0.0003	<0.00023	
MW-74A	Phenolics	mg/L	*0.015*	<0.05	<0.016	<0.016	<0.050	<0.050	<0.050	<0.050	<0.006	<0.050	0.0098	
MW-74A	Arsenic	mg/L	*0.014*	0.0134	0.0134	0.0167	0.0153	0.0162	0.0148	0.0139	0.0133	0.0124	0.0133	
MW-74A	Chromium	mg/L	*0.026*	0.001	0.0017 J	<0.010	0.0034	0.0013	0.0013	0.0018	0.0011	<0.001	<0.0027	
MW-74A	Lead	mg/L	*0.01*	0.004	0.0035	0.0093	0.007	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0036	
MW-74A	Selenium	mg/L	*0.1*	0.0680	0.0073	0.0074	0.0105	<0.005	0.007	<0.005	<0.005	0.0053	<0.014	
MW-74A	D. O.	mg/L	na	6.8	14.6	2.6	6.0	2.5	4.3	3.9	4.1	4.2	4.8	
MW-74A	ORP	mV	na	180.0	165.0	22.0	141.4	95.0	88.8	66.4	68.2	80.7	67.1	
MW-74A	pH	S. U.	*na*	6.70	7.19	7.34	7.17	7.39	7.33	7.37	7.39	6.98	6.90	
MW-74A	Conductance	µmhos/cm	*na*	779	606	496	713	658	690	695	627	672	690	
MW-74A	Temperature	°C	*na*	22.0	24.7	24.0	23.8	23.2	23.0	24.5	23.2	24.1	25.2	
MW-74A	Turbidity	NTU	*na*	20.9	0.0	0.0	2.5	4.0	1.2	1.7	5.5	5.8	6.5	

nm - Not Measured, ns - Not Sampled, na - Not Analyzed

Table VI.B.3.a - Site H Historical Groundwater Analysis
Alon USA LP - Big Spring Refinery

Well	Analyte	Units	GWPS mg/L	Jul-92	Oct-92	Jan-93	Apr-93	Jul-93	Jan-94	Jul-94	Jan-95	Jul-95	Jan-96	Jul-96
MW-75	Benzene	mg/L	*0.002*	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MW-75	Toluene	mg/L	*0.002*	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MW-75	Phenolics	mg/L	*0.015*	0.001	<0.005	< 0.005	< 0.01	< 0.005	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
MW-75	Arsenic	mg/L	*0.014*	<0.006	0.0060	0.0070	0.0060	0.0180	< 0.005	0.0060	0.0060	0.0080	0.0060	0.0110
MW-75	Chromium	mg/L	*0.026*	<0.005	<0.005	< 0.01	< 0.01	<0.05	< 0.01	< 0.005	<0.002	< 0.002	0.002	0.005
MW-75	Lead	mg/L	*0.01*	<0.005	<0.005	< 0.005	<0.004	< 0.002	< 0.002	0.026	<0.005	0.031	0.032	0.021
MW-75	Selenium	mg/L	*0.1*	<0.05	0.0500	<0.05	<0.05	<0.05	<0.05	< 0.005	0.0360	< 0.005	< 0.005	0.0050
MW-75	D. O.	mg/L	na	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-75	ORP	mV	na	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-75	pH	S. U.	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-75	Conductance	µmhos/cm	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-75	Temperature	°C	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-75	Turbidity	NTU	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-75A	Benzene	mg/L	*0.002*	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	1.100	1.800	1.800	< 1.0	< 1.0	< 1.0
MW-75A	Toluene	mg/L	*0.002*	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MW-75A	Phenolics	mg/L	*0.015*	0.003	<0.005	< 0.005	0.030	<0.005	< 0.01	< 0.01	< 0.01	0.030	< 0.01	< 0.01
MW-75A	Arsenic	mg/L	*0.014*	0.0070	0.0080	0.0060	0.0050	0.0220	0.0120	0.0150	0.0060	0.0090	0.0070	0.0100
MW-75A	Chromium	mg/L	*0.026*	0.007	<0.005	< 0.01	0.010	<0.05	< 0.01	< 0.005	<0.002	< 0.002	< 0.002	0.005
MW-75A	Lead	mg/L	*0.01*	< 0.005	<0.005	< 0.005	<0.004	<0.002	< 0.002	< 0.005	< 0.005	0.014	0.013	0.014
MW-75A	Selenium	mg/L	*0.1*	< 0.05	<0.05	<0.05	<0.05	<0.05	<0.05	< 0.005	0.0070	< 0.005	< 0.005	0.0050
MW-75A	D. O.	mg/L	na	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-75A	ORP	mV	na	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-75A	pH	S. U.	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-75A	Conductance	µmhos/cm	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-75A	Temperature	°C	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-75A	Turbidity	NTU	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm

nm - Not Measured, ns - Not Sampled, na - Not Analyzed

Table VI.B.3.a - Site H Historical Groundwater Analysis
Alon USA LP - Big Spring Refinery

Well	Analyte	Units	GWPS mg/L	Jan-97	Jul-97	Jan-98	Jul-98	Jan-99	Jul-99	Jan-00	Jul-00	Jan-01	Jan-02	Jul-02
MW-75	Benzene	mg/L	*0.002*	<0.001	<0.001	<0.001	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
MW-75	Toluene	mg/L	*0.002*	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
MW-75	Phenolics	mg/L	*0.015*	<0.01	<0.01	<0.01	<0.005	<0.01	<0.01	<0.01	<0.01	<0.005	<0.01	<0.01
MW-75	Arsenic	mg/L	*0.014*	0.0110	0.0100	0.0100	0.0090	0.0090	0.0126	0.0097	0.0104	0.0110	0.0088	0.0254
MW-75	Chromium	mg/L	*0.026*	<0.005	<0.005	<0.005	<0.002	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
MW-75	Lead	mg/L	*0.01*	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
MW-75	Selenium	mg/L	*0.1*	0.0120	0.0110	0.0150	0.0090	0.0310	0.0394	0.0284	0.0346	0.0450	0.0343	0.0482
MW-75	D. O.	mg/L	na	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-75	ORP	mV	na	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-75	pH	S. U.	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-75	Conductance	µmhos/cm	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-75	Temperature	°C	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-75	Turbidity	NTU	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-75A	Benzene	mg/L	*0.002*	<0.001	<0.001	<0.001	<0.001	<0.001	ns	<0.001	<0.001	<0.001	<0.001	<0.001
MW-75A	Toluene	mg/L	*0.002*	<0.001	<0.001	<0.001	<0.001	<0.001	ns	<0.001	<0.001	<0.001	<0.001	<0.001
MW-75A	Phenolics	mg/L	*0.015*	<0.01	<0.01	<0.01	<0.005	<0.01	ns	<0.01	<0.01	<0.005	<0.01	<0.01
MW-75A	Arsenic	mg/L	*0.014*	0.0070	0.0110	0.0090	0.0120	0.0100	ns	0.0084	0.0088	0.0080	0.0104	0.0361
MW-75A	Chromium	mg/L	*0.026*	<0.005	<0.005	<0.005	<0.002	<0.005	ns	<0.005	<0.005	<0.005	<0.005	<0.005
MW-75A	Lead	mg/L	*0.01*	<0.005	<0.005	<0.005	<0.005	<0.005	ns	<0.005	<0.005	<0.005	<0.005	<0.005
MW-75A	Selenium	mg/L	*0.1*	0.0220	0.0190	0.0220	0.0100	0.0240	ns	0.0205	0.0260	0.0300	0.0294	0.0349
MW-75A	D. O.	mg/L	na	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-75A	ORP	mV	na	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-75A	pH	S. U.	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-75A	Conductance	µmhos/cm	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-75A	Temperature	°C	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-75A	Turbidity	NTU	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm

nm - Not Measured, ns - Not Sampled, na - Not Analyzed

Table VI.B.3.a - Site H Historical Groundwater Analysis
Alon USA LP - Big Spring Refinery

Well	Analyte	Units	GWPS mg/L	Jan-03	Jul-03	Jul-04	Jul-05	Jul-06	Jul-07	Jul-08	Jul-09	Jul-10	Jul-11	Jul-12
MW-75	Benzene	mg/L	*0.002*	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.00025	<0.001
MW-75	Toluene	mg/L	*0.002*	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.00026	<0.001
MW-75	Phenolics	mg/L	*0.015*	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.005	<0.005	<0.024	<0.05
MW-75	Arsenic	mg/L	*0.014*	0.0073	0.0084	0.00908	0.0103	0.00829	0.00879	0.00729	0.00659	0.0067	0.0067	0.0085
MW-75	Chromium	mg/L	*0.026*	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.00706	<0.005	0.002	<0.01
MW-75	Lead	mg/L	*0.01*	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.0087	<0.0017	0.005
MW-75	Selenium	mg/L	*0.1*	0.0360	0.0414	0.0309	0.026	0.0317	0.0192	0.0238	0.0343	0.0239	0.019	0.0151
MW-75	D. O.	mg/L	na	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	4.4
MW-75	ORP	mV	na	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	161.0
MW-75	pH	S. U.	*na*	nm	nm	nm	nm	nm	nm	nm	nm	7.57	6.32	7.46
MW-75	Conductance	µmhos/cm	*na*	nm	nm	nm	nm	nm	nm	nm	nm	1,638	1,400	1,420
MW-75	Temperature	°C	*na*	nm	nm	nm	nm	nm	nm	nm	nm	22.1	24.0	21.9
MW-75	Turbidity	NTU	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	0.0	0.0
MW-75A	Benzene	mg/L	*0.002*	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.00025	<0.001
MW-75A	Toluene	mg/L	*0.002*	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.00026	<0.001
MW-75A	Phenolics	mg/L	*0.015*	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.005	<0.005	<0.024	<0.05
MW-75A	Arsenic	mg/L	*0.014*	0.0112	0.0069	0.013	0.00745	0.0121	0.0124	0.0116	0.0118	0.0096	0.0138	0.0147
MW-75A	Chromium	mg/L	*0.026*	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0019	<0.01
MW-75A	Lead	mg/L	*0.01*	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.0129	<0.0017	0.007
MW-75A	Selenium	mg/L	*0.1*	0.0284	0.0389	0.0264	0.0239	0.0226	0.0152	0.0133	0.0125	0.0129	0.0101	0.0061
MW-75A	D. O.	mg/L	na	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	5.9
MW-75A	ORP	mV	na	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	170.0
MW-75A	pH	S. U.	*na*	nm	nm	nm	nm	nm	nm	nm	nm	7.16	7.01	7.70
MW-75A	Conductance	µmhos/cm	*na*	nm	nm	nm	nm	nm	nm	nm	nm	1,269	810	767
MW-75A	Temperature	°C	*na*	nm	nm	nm	nm	nm	nm	nm	nm	27.3	24.4	21.6
MW-75A	Turbidity	NTU	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	0.0	31.1

nm - Not Measured, ns - Not Sampled, na - Not Analyzed

Table VI.B.3.a - Site H Historical Groundwater Analysis
Alon USA LP - Big Spring Refinery

Well	Analyte	Units	GWPS mg/L	Jul-13	Jul-14	Jul-15	Jul-16	Jul-17	Jul-18	Jul-19	Jul-20	Jul-21	Jul-22	Jul-23
MW-75	Benzene	mg/L	*0.002*	<0.001	<0.001	<0.001	<0.00047	<0.0003	<0.00040	<0.00040	<0.001	<0.0003	<0.00023	
MW-75	Toluene	mg/L	*0.002*	<0.001	<0.001	<0.001	<0.00049	0.00047J	<0.00042	<0.00042	<0.001	<0.0003	<0.00023	
MW-75	Phenolics	mg/L	*0.015*	<0.05	0.020 J	<0.016	<0.050	<0.050	<0.050	<0.050	0.007	<0.050	<0.0030	
MW-75	Arsenic	mg/L	*0.014*	0.0079	0.0123	0.0143	0.0141	0.0167	0.0113	0.011	0.0089	0.0076	0.0131	
MW-75	Chromium	mg/L	*0.026*	0.002	0.0025 J	<0.010	0.0044	0.0045	0.0014	0.0022	0.0022	0.0021	<0.0027	
MW-75	Lead	mg/L	*0.01*	0.003	0.0032	0.0076	0.0036	0.0018	<0.001	<0.001	<0.001	<0.001	<0.0036	
MW-75	Selenium	mg/L	*0.1*	0.0208	0.0149	0.0092	0.017	0.0096	0.0105	0.0103	0.0118	0.0161	<0.014	
MW-75	D. O.	mg/L	na	7.9	3.7	3.2	6.2	6.8	5.8	3.5	3.9	3.3	4.1	
MW-75	ORP	mV	na	141.0	107.0	167.0	140.1	117.8	68.5	77.1	93.8	70.7	81.3	
MW-75	pH	S. U.	*na*	6.89	6.98	7.93	7.08	7.23	7.26	7.34	7.52	7.02	6.98	
MW-75	Conductance	µmhos/cm	*na*	1,470	973	736	885	752	1,030	842	749	1,090	720	
MW-75	Temperature	°C	*na*	23.3	34.0	22.8	22.7	23.3	23.4	24.2	23.2	23.1	23.9	
MW-75	Turbidity	NTU	*na*	0.0	4.5	0.0	10.4	8.9	5.7	4.3	7.6	4.1	4.8	
MW-75A	Benzene	mg/L	*0.002*	<0.001	<0.001	<0.001	<0.00047	<0.0003	<0.00040	<0.00040	<0.001	<0.0003	<0.00023	
MW-75A	Toluene	mg/L	*0.002*	<0.001	<0.001	<0.001	<0.00049	0.00046J	<0.00042	<0.00042	<0.001	<0.0003	<0.00023	
MW-75A	Phenolics	mg/L	*0.015*	<0.05	0.026 J	<0.016	<0.050	<0.050	<0.050	<0.050	0.007	<0.050	<0.0030	
MW-75A	Arsenic	mg/L	*0.014*	0.0151	0.008	0.016	0.0118	0.0156	0.0132	0.0134	0.0125	0.0132	0.0154	
MW-75A	Chromium	mg/L	*0.026*	0.002	0.0027 J	<0.010	0.0036	0.0206	0.0062	0.0041	0.0073	0.0018	<0.0027	
MW-75A	Lead	mg/L	*0.01*	0.006	0.0049	0.0108	0.0045	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0036	
MW-75A	Selenium	mg/L	*0.1*	0.0102	0.0092	0.007	0.0139	0.0061	0.0082	0.0088	0.0067	0.008	<0.014	
MW-75A	D. O.	mg/L	na	9.5	16.0	3.7	5.8	5.5	5.3	3.5	3.3	3.6	4.0	
MW-75A	ORP	mV	na	137.0	97.0	117.0	140.1	80.4	41.8	80.5	65.6	83.6	75.4	
MW-75A	pH	S. U.	*na*	7.17	7.15	9.64	7.16	7.04	7.19	7.44	7.61	7.15	7.11	
MW-75A	Conductance	µmhos/cm	*na*	772	818	543	711	629	685	741	673	683	671	
MW-75A	Temperature	°C	*na*	23.1	23.9	24.5	23.8	23.9	23.9	25.2	29.8	24.6	24.2	
MW-75A	Turbidity	NTU	*na*	4.5	0.0	0.0	4.8	5.7	5.7	6.3	6.8	5.7	5.8	

nm - Not Measured, ns - Not Sampled, na - Not Analyzed

Table VI.B.3.a - Site H Historical Groundwater Analysis
Alon USA LP - Big Spring Refinery

Well	Analyte	Units	GWPS mg/L	Jul-92	Oct-92	Jan-93	Apr-93	Jul-93	Jan-94	Jul-94	Jan-95	Jul-95	Jan-96	Jul-96
MW-76	Benzene	mg/L	*0.002*	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MW-76	Toluene	mg/L	*0.002*	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MW-76	Phenolics	mg/L	*0.015*	0.001	<0.005	< 0.005	0.010	< 0.005	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
MW-76	Arsenic	mg/L	*0.014*	0.0070	0.0070	0.0080	0.0050	< 0.005	< 0.005	0.0080	0.0080	0.0090	0.0080	0.0080
MW-76	Chromium	mg/L	*0.026*	< 0.005	0.007	< 0.01	< 0.01	<0.05	< 0.01	< 0.005	0.004	0.003	0.010	0.005
MW-76	Lead	mg/L	*0.01*	< 0.005	<0.005	< 0.005	<0.004	< 0.002	< 0.002	0.009	<0.005	0.010	0.010	0.013
MW-76	Selenium	mg/L	*0.1*	< 0.05	0.0500	<0.05	<0.05	<0.05	<0.05	< 0.005	0.0080	< 0.005	< 0.005	0.0050
MW-76	D. O.	mg/L	na	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-76	ORP	mV	na	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-76	pH	S. U.	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-76	Conductance	µmhos/cm	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-76	Temperature	°C	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-76	Turbidity	NTU	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-76A	Benzene	mg/L	*0.002*	< 1.0	< 1.0	< 1.0	< 1.0	<1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MW-76A	Toluene	mg/L	*0.002*	< 1.0	< 1.0	< 1.0	< 1.0	<1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MW-76A	Phenolics	mg/L	*0.015*	0.013	<0.005	0.006	<0.01	<0.005	0.010	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
MW-76A	Arsenic	mg/L	*0.014*	0.0080	0.0080	0.0100	0.0050	0.0120	0.0120	0.0090	0.0060	0.0100	0.0090	0.0110
MW-76A	Chromium	mg/L	*0.026*	< 0.005	<0.005	< 0.01	0.010	<0.05	< 0.01	< 0.005	< 0.002	< 0.002	< 0.002	0.005
MW-76A	Lead	mg/L	*0.01*	< 0.005	<0.005	< 0.005	<0.004	<0.002	< 0.002	0.006	<0.005	< 0.005	< 0.005	0.013
MW-76A	Selenium	mg/L	*0.1*	< 0.05	<0.05	<0.05	<0.05	<0.05	<0.05	< 0.005	0.0070	< 0.005	< 0.005	0.0050
MW-76A	D. O.	mg/L	na	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-76A	ORP	mV	na	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-76A	pH	S. U.	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-76A	Conductance	µmhos/cm	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-76A	Temperature	°C	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-76A	Turbidity	NTU	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm

nm - Not Measured, ns - Not Sampled, na - Not Analyzed

Table VI.B.3.a - Site H Historical Groundwater Analysis
Alon USA LP - Big Spring Refinery

Well	Analyte	Units	GWPS mg/L	Jan-97	Jul-97	Jan-98	Jul-98	Jan-99	Jul-99	Jan-00	Jul-00	Jan-01	Jan-02	Jul-02
MW-76	Benzene	mg/L	*0.002*	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
MW-76	Toluene	mg/L	*0.002*	<0.001	<0.001	<0.001	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
MW-76	Phenolics	mg/L	*0.015*	<0.01	<0.01	<0.01	<0.005	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
MW-76	Arsenic	mg/L	*0.014*	0.0070	0.0070	0.0070	0.0070	0.0080	0.0086	0.0050	0.0072	0.0100	0.0081	0.0129
MW-76	Chromium	mg/L	*0.026*	<0.005	<0.005	<0.005	0.002	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
MW-76	Lead	mg/L	*0.01*	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
MW-76	Selenium	mg/L	*0.1*	0.0130	0.0130	0.0090	0.0080	0.0120	0.0124	0.0139	0.0114	0.0160	0.0110	0.0160
MW-76	D. O.	mg/L	na	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-76	ORP	mV	na	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-76	pH	S. U.	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-76	Conductance	µmhos/cm	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-76	Temperature	°C	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-76	Turbidity	NTU	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-76A	Benzene	mg/L	*0.002*	<0.001	<0.001	<0.001	<0.001	<0.001	ns	<0.001	<0.001	<0.001	<0.001	<0.001
MW-76A	Toluene	mg/L	*0.002*	<0.001	<0.001	<0.001	0.002	<0.001	ns	<0.001	<0.001	<0.001	<0.001	<0.001
MW-76A	Phenolics	mg/L	*0.015*	<0.01	<0.01	<0.01	<0.005	<0.01	ns	<0.01	<0.01	<0.005	<0.01	<0.01
MW-76A	Arsenic	mg/L	*0.014*	0.0070	0.0090	0.0090	<0.005	0.0090	ns	0.0092	0.0097	0.0100	0.0087	0.0143
MW-76A	Chromium	mg/L	*0.026*	<0.005	<0.005	<0.005	<0.002	<0.005	ns	<0.005	<0.005	<0.005	<0.005	<0.005
MW-76A	Lead	mg/L	*0.01*	<0.005	<0.005	<0.005	<0.005	<0.005	ns	<0.005	<0.005	<0.005	<0.005	<0.005
MW-76A	Selenium	mg/L	*0.1*	<0.005	<0.005	<0.005	0.0100	<0.005	ns	<0.005	0.0166	<0.005	<0.005	<0.005
MW-76A	D. O.	mg/L	na	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-76A	ORP	mV	na	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-76A	pH	S. U.	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-76A	Conductance	µmhos/cm	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-76A	Temperature	°C	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-76A	Turbidity	NTU	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm

nm - Not Measured, ns - Not Sampled, na - Not Analyzed

Table VI.B.3.a - Site H Historical Groundwater Analysis
Alon USA LP - Big Spring Refinery

Well	Analyte	Units	GWPS mg/L	Jan-03	Jul-03	Jul-04	Jul-05	Jul-06	Jul-07	Jul-08	Jul-09	Jul-10	Jul-11	Jul-12
MW-76	Benzene	mg/L	*0.002*	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.00025	DRY
MW-76	Toluene	mg/L	*0.002*	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.00026	DRY
MW-76	Phenolics	mg/L	*0.015*	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.005	<0.005	<0.024	DRY
MW-76	Arsenic	mg/L	*0.014*	0.0114	0.0066	0.00823	0.00802	0.00916	0.00962	0.00798	0.00695	0.00703	0.0071	DRY
MW-76	Chromium	mg/L	*0.026*	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0019	DRY
MW-76	Lead	mg/L	*0.01*	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0017	DRY
MW-76	Selenium	mg/L	*0.1*	0.0079	0.0082	0.0112	0.0125	0.0112	0.00844	0.0119	0.00994	0.00988	0.0094	DRY
MW-76	D. O.	mg/L	na	nm	nm	nm	nm	nm	nm	nm	nm	nm	5.8	DRY
MW-76	ORP	mV	na	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	DRY
MW-76	pH	S. U.	*na*	nm	nm	nm	nm	nm	nm	nm	nm	7.57	6.65	DRY
MW-76	Conductance	µmhos/cm	*na*	nm	nm	nm	nm	nm	nm	nm	nm	837	870	DRY
MW-76	Temperature	°C	*na*	nm	nm	nm	nm	nm	nm	nm	nm	22.1	23.7	DRY
MW-76	Turbidity	NTU	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	17.9	DRY
MW-76A	Benzene	mg/L	*0.002*	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.00025	<0.001
MW-76A	Toluene	mg/L	*0.002*	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.00026	<0.001
MW-76A	Phenolics	mg/L	*0.015*	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.005	<0.005	<0.024	<0.05
MW-76A	Arsenic	mg/L	*0.014*	0.0113	0.0068	0.00859	0.009	0.0102	0.00977	<0.005	0.00730	0.00747	0.008	0.0094
MW-76A	Chromium	mg/L	*0.026*	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0019	<0.01
MW-76A	Lead	mg/L	*0.01*	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0017	0.007
MW-76A	Selenium	mg/L	*0.1*	<0.005	0.0050	<0.005	<0.005	0.0052	<0.005	<0.005	0.00726	0.00945	0.0154	0.0150
MW-76A	D. O.	mg/L	na	nm	nm	nm	nm	nm	nm	nm	nm	nm	6.0	5.7
MW-76A	ORP	mV	na	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	146.0
MW-76A	pH	S. U.	*na*	nm	nm	nm	nm	nm	nm	nm	nm	7.51	7.34	7.76
MW-76A	Conductance	µmhos/cm	*na*	nm	nm	nm	nm	nm	nm	nm	nm	694	750	780
MW-76A	Temperature	°C	*na*	nm	nm	nm	nm	nm	nm	nm	nm	23.4	23.6	21.8
MW-76A	Turbidity	NTU	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	3.3	4.9

nm - Not Measured, ns - Not Sampled, na - Not Analyzed

Table VI.B.3.a - Site H Historical Groundwater Analysis
Alon USA LP - Big Spring Refinery

Well	Analyte	Units	GWPS mg/L	Jul-13	Jul-14	Jul-15	Jul-16	Jul-17	Jul-18	Jul-19	Jul-20	Jul-21	Jul-22	Jul-23
MW-76	Benzene	mg/L	*0.002*	<0.001	<0.001	<0.001	<0.00047	<0.0003	<0.00040	<0.00040	<0.001	<0.0003	<0.00023	
MW-76	Toluene	mg/L	*0.002*	<0.001	<0.001	<0.001	<0.00049	0.00059J	<0.00042	<0.00042	<0.001	<0.0003	<0.00023	
MW-76	Phenolics	mg/L	*0.015*	<0.05	<0.016	<0.016	<0.050	<0.050	<0.050	<0.050	<0.006	<0.050	0.0051	
MW-76	Arsenic	mg/L	*0.014*	0.0064	<0.0047	0.0082	<0.005	0.0067	0.0056	0.0059	0.006	0.0057	0.0069	
MW-76	Chromium	mg/L	*0.026*	0.002	0.0019 J	<0.010	0.023	0.048	0.0026	0.0063	0.0117	0.002	0.0312	
MW-76	Lead	mg/L	*0.01*	0.003	0.0021 J	0.0078	0.0077	0.0012	<0.001	<0.001	<0.001	<0.001	<0.0036	
MW-76	Selenium	mg/L	*0.1*	0.0159	0.0123	0.0133	0.016	0.0204	0.0215	0.029	0.0259	0.0281	0.0298	
MW-76	D. O.	mg/L	na	7.7	10.6	6.5	3.9	2.8	5.8	4.0	4.6	4.5	5.4	
MW-76	ORP	mV	na	201.0	117.0	101.0	(53.8)	72.1	114.2	103.8	107.1	60.1	72.4	
MW-76	pH	S. U.	*na*	7.19	7.43	9.68	6.84	7.27	7.05	7.16	7.03	7.07	6.89	
MW-76	Conductance	µmhos/cm	*na*	995	787	652	902	1,148	1,201	1,141	1,249	1,280	1,383	
MW-76	Temperature	°C	*na*	21.9	26.4	26.3	24.1	26.5	24.2	25.6	24.5	25.2	22.7	
MW-76	Turbidity	NTU	*na*	3.0	0.0	0.0	2.9	17.4	6.8	4.9	5.5	7.1	7.5	
MW-76A	Benzene	mg/L	*0.002*	<0.001	<0.001	<0.001	<0.00047	<0.0003	<0.00040	<0.00040	<0.001	<0.0003	<0.00023	
MW-76A	Toluene	mg/L	*0.002*	<0.001	<0.001	<0.001	<0.00049	0.00052J	<0.00042	<0.00042	<0.001	<0.0003	<0.00023	
MW-76A	Phenolics	mg/L	*0.015*	<0.05	0.018 J	<0.016	<0.050	<0.050	<0.050	<0.050	<0.006	<0.050	0.019	
MW-76A	Arsenic	mg/L	*0.014*	0.0069	0.0092	0.0122	0.0107	0.0075	0.0072	0.0069	0.0066	0.0065	0.0076	
MW-76A	Chromium	mg/L	*0.026*	0.001	0.0013 J	<0.010	0.0029	<0.001	<0.001	0.0012	<0.001	<0.001	<0.0027	
MW-76A	Lead	mg/L	*0.01*	0.004	0.003	0.0095	0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0036	
MW-76A	Selenium	mg/L	*0.1*	0.0194	0.0118	0.0092	0.0169	0.0137	0.013	0.0129	0.0122	0.0136	0.0173 J	
MW-76A	D. O.	mg/L	na	7.6	1.8	3.8	2.7	2.3	4.8	3.8	4.2	5.4	6.5	
MW-76A	ORP	mV	na	154.0	(8.0)	115.0	79.5	105.3	156.4	109.4	103.1	67.1	93.7	
MW-76A	pH	S. U.	*na*	8.04	7.18	9.00	7.15	7.16	6.94	7.07	6.93	6.89	6.68	
MW-76A	Conductance	µmhos/cm	*na*	845	852	465	640	818	839	895	918	865	932	
MW-76A	Temperature	°C	*na*	21.7	27.7	24.7	23.7	23.9	23.4	25.6	24.9	26.6	23.2	
MW-76A	Turbidity	NTU	*na*	1.4	0.0	0.0	0.8	5.2	4.9	7.0	7.0	7.5	6.2	

nm - Not Measured, ns - Not Sampled, na - Not Analyzed

Table VI.B.3.a - Site H Historical Groundwater Analysis
Alon USA LP - Big Spring Refinery

Well	Analyte	Units	GWPS mg/L	Jul-92	Oct-92	Jan-93	Apr-93	Jul-93	Jan-94	Jul-94	Jan-95	Jul-95	Jan-96	Jul-96
MW-77	Benzene	mg/L	*0.002*	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MW-77	Toluene	mg/L	*0.002*	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MW-77	Phenolics	mg/L	*0.015*	< 0.001	<0.005	< 0.005	0.020	< 0.005	0.050	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
MW-77	Arsenic	mg/L	*0.014*	< 0.005	<0.005	< 0.005	0.0090	< 0.005	< 0.005	0.0060	<0.005	0.0060	< 0.005	0.0080
MW-77	Chromium	mg/L	*0.026*	< 0.005	0.005	< 0.01	< 0.01	<0.05	< 0.01	< 0.005	<0.002	< 0.002	0.010	0.005
MW-77	Lead	mg/L	*0.01*	< 0.005	<0.005	< 0.005	<0.004	< 0.002	< 0.002	0.034	<0.005	0.037	0.030	0.029
MW-77	Selenium	mg/L	*0.1*	< 0.05	<0.05	<0.05	<0.05	<0.05	<0.05	< 0.005	0.0300	< 0.005	< 0.005	0.0050
MW-77	D. O.	mg/L	na	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-77	ORP	mV	na	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-77	pH	S. U.	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-77	Conductance	µmhos/cm	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-77	Temperature	°C	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-77	Turbidity	NTU	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-77A	Benzene	mg/L	*0.002*	< 1.0	< 1.0	< 1.0	< 1.0	<1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MW-77A	Toluene	mg/L	*0.002*	< 1.0	< 1.0	< 1.0	< 1.0	<1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MW-77A	Phenolics	mg/L	*0.015*	0.001	0.005	< 0.005	0.030	<0.005	0.020	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
MW-77A	Arsenic	mg/L	*0.014*	0.0080	0.0070	0.0090	0.0050	0.0090	< 0.005	0.0090	0.0050	0.0080	0.0090	0.0100
MW-77A	Chromium	mg/L	*0.026*	< 0.005	0.006	0.030	0.010	<0.05	< 0.01	< 0.005	< 0.002	< 0.002	< 0.002	0.005
MW-77A	Lead	mg/L	*0.01*	< 0.005	<0.005	< 0.005	<0.004	<0.002	< 0.002	0.027	<0.005	0.028	0.024	0.021
MW-77A	Selenium	mg/L	*0.1*	< 0.05	<0.05	<0.05	<0.05	<0.05	<0.05	< 0.005	0.0260	< 0.005	< 0.005	0.0050
MW-77A	D. O.	mg/L	na	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-77A	ORP	mV	na	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-77A	pH	S. U.	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-77A	Conductance	µmhos/cm	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-77A	Temperature	°C	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-77A	Turbidity	NTU	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm

nm - Not Measured, ns - Not Sampled, na - Not Analyzed

Table VI.B.3.a - Site H Historical Groundwater Analysis
Alon USA LP - Big Spring Refinery

Well	Analyte	Units	GWPS mg/L	Jan-97	Jul-97	Jan-98	Jul-98	Jan-99	Jul-99	Jan-00	Jul-00	Jan-01	Jan-02	Jul-02
MW-77	Benzene	mg/L	*0.002*	<0.001	<0.001	<0.001	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
MW-77	Toluene	mg/L	*0.002*	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
MW-77	Phenolics	mg/L	*0.015*	<0.01	<0.01	<0.01	<0.005	<0.01	<0.01	<0.01	<0.01	<0.005	<0.01	<0.01
MW-77	Arsenic	mg/L	*0.014*	<0.005	<0.005	0.0070	0.0080	0.0060	0.0099	0.0068	0.0089	0.0080	0.0084	0.0088
MW-77	Chromium	mg/L	*0.026*	<0.005	<0.005	<0.005	0.002	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
MW-77	Lead	mg/L	*0.01*	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
MW-77	Selenium	mg/L	*0.1*	0.0300	0.0250	0.0250	0.0070	0.0280	0.0192	0.0178	0.0166	0.0210	0.0181	0.0205
MW-77	D. O.	mg/L	na	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-77	ORP	mV	na	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-77	pH	S. U.	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-77	Conductance	µmhos/cm	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-77	Temperature	°C	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-77	Turbidity	NTU	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-77A	Benzene	mg/L	*0.002*	<0.001	<0.001	<0.001	0.002	<0.001	ns	<0.001	<0.001	<0.001	<0.001	<0.001
MW-77A	Toluene	mg/L	*0.002*	<0.001	<0.001	<0.001	0.001	<0.001	ns	<0.001	<0.001	<0.001	<0.001	<0.001
MW-77A	Phenolics	mg/L	*0.015*	<0.01	<0.01	<0.01	<0.005	<0.01	ns	<0.01	<0.01	<0.005	<0.01	<0.01
MW-77A	Arsenic	mg/L	*0.014*	0.0080	0.0080	0.0090	0.0070	0.0090	ns	0.0081	0.0102	0.0120	0.0094	0.0191
MW-77A	Chromium	mg/L	*0.026*	<0.005	<0.005	<0.005	<0.002	<0.005	ns	<0.005	<0.005	<0.005	<0.005	<0.005
MW-77A	Lead	mg/L	*0.01*	<0.005	<0.005	<0.005	<0.005	<0.005	ns	<0.005	<0.005	<0.005	<0.005	<0.005
MW-77A	Selenium	mg/L	*0.1*	0.0190	0.0170	0.0070	0.0100	0.0160	ns	0.0128	0.0123	0.0130	0.0064	0.0058
MW-77A	D. O.	mg/L	na	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-77A	ORP	mV	na	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-77A	pH	S. U.	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-77A	Conductance	µmhos/cm	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-77A	Temperature	°C	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
MW-77A	Turbidity	NTU	*na*	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm

nm - Not Measured, ns - Not Sampled, na - Not Analyzed

Table VI.B.3.a - Site H Historical Groundwater Analysis
Alon USA LP - Big Spring Refinery

Well	Analyte	Units	GWPS mg/L	Jan-03	Jul-03	Jul-04	Jul-05	Jul-06	Jul-07	Jul-08	Jul-09	Jul-10	Jul-11	Jul-12
MW-77	Benzene	mg/L	*0.002*	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.00025	<0.01
MW-77	Toluene	mg/L	*0.002*	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0022	<0.00026	<0.01
MW-77	Phenolics	mg/L	*0.015*	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.0109	<0.005	<0.005	<0.024	<0.05
MW-77	Arsenic	mg/L	*0.014*	0.0086	0.0054	0.0066	0.0051	0.0059	0.00596	0.00509	<0.005	0.0051	0.0047	0.0051
MW-77	Chromium	mg/L	*0.026*	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.0023	<0.01
MW-77	Lead	mg/L	*0.01*	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0017	0.004
MW-77	Selenium	mg/L	*0.1*	0.0213	0.0226	0.0126	0.0157	0.0194	0.0178	0.0176	0.0175	0.0196	0.0264	0.0108
MW-77	D. O.	mg/L	na	nm	nm	nm	nm	nm	nm	nm	nm	nm	11.0	7.6
MW-77	ORP	mV	na	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	131.0
MW-77	pH	S. U.	*na*	nm	nm	nm	nm	nm	nm	nm	nm	6.85	6.02	7.63
MW-77	Conductance	µmhos/cm	*na*	nm	nm	nm	nm	nm	nm	nm	nm	1,440	1,320	1,170
MW-77	Temperature	°C	*na*	nm	nm	nm	nm	nm	nm	nm	nm	24.4	28.5	21.3
MW-77	Turbidity	NTU	*na*	nm	nm	nm	nm	nm	nm	nm	nm	0.0	0.0	0.0
MW-77A	Benzene	mg/L	*0.002*	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.00025	<0.001
MW-77A	Toluene	mg/L	*0.002*	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0021	<0.00026	<0.001
MW-77A	Phenolics	mg/L	*0.015*	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.005	<0.005	<0.024	<0.05
MW-77A	Arsenic	mg/L	*0.014*	0.0143	0.0087	0.0106	0.0094	0.0104	0.00989	0.0088	0.00853	0.00902	0.0099	0.0121
MW-77A	Chromium	mg/L	*0.026*	<0.005	<0.005	<0.005	<0.005	0.00563	<0.005	<0.005	<0.005	<0.005	<0.0019	<0.01
MW-77A	Lead	mg/L	*0.01*	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0017	0.007
MW-77A	Selenium	mg/L	*0.1*	0.0093	0.0152	0.00601	0.00679	0.00874	0.00659	0.0074	0.0117	0.00906	0.0118	0.0098
MW-77A	D. O.	mg/L	na	nm	nm	nm	nm	nm	nm	nm	nm	nm	6.5	7.9
MW-77A	ORP	mV	na	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	157.0
MW-77A	pH	S. U.	*na*	nm	nm	nm	nm	nm	nm	nm	nm	6.10	6.35	7.83
MW-77A	Conductance	µmhos/cm	*na*	nm	nm	nm	nm	nm	nm	nm	nm	1,000	850	833
MW-77A	Temperature	°C	*na*	nm	nm	nm	nm	nm	nm	nm	nm	25.9	27.7	22.0
MW-77A	Turbidity	NTU	*na*	nm	nm	nm	nm	nm	nm	nm	nm	0.0	0.0	0.0

nm - Not Measured, ns - Not Sampled, na - Not Analyzed

Table VI.B.3.a - Site H Historical Groundwater Analysis
Alon USA LP - Big Spring Refinery

Well	Analyte	Units	GWPS mg/L	Jul-13	Jul-14	Jul-15	Jul-16	Jul-17	Jul-18	Jul-19	Jul-20	Jul-21	Jul-22	Jul-23
MW-77	Benzene	mg/L	*0.002*	<0.001	<0.001	<0.00034	<0.00047	<0.0003	<0.00040	<0.00040	<0.001	<0.0003	<0.00023	
MW-77	Toluene	mg/L	*0.002*	<0.000	<0.001	<0.00033	<0.00049	0.00052J	<0.00042	<0.00042	<0.001	<0.0003	<0.00023	
MW-77	Phenolics	mg/L	*0.015*	<0.05	<0.016	0.0026J	<0.050	<0.050	<0.050	<0.050	<0.006	<0.050	0.0066	
MW-77	Arsenic	mg/L	*0.014*	0.0040	0.0065	0.005	0.0051J	0.0051	0.0046	0.0048	0.0036	0.004	0.0048 J	
MW-77	Chromium	mg/L	*0.026*	0.002	0.0023 J	0.0017J	0.126	0.0065	0.0097	0.0056	0.0042	0.0014	<0.0027	
MW-77	Lead	mg/L	*0.01*	0.002	0.0021 J	<0.00085	<0.0036	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0036	
MW-77	Selenium	mg/L	*0.1*	0.0094	0.0181	<0.00099	0.0104	0.0167	0.014	0.0167	0.0135	0.0183	0.0261	
MW-77	D. O.	mg/L	na	5.5	9.1	7.1	3.6	3.6	3.5	2.8	2.7	3.0	4.5	
MW-77	ORP	mV	na	174.0	91.0	205.0	112.3	91.1	116.7	83.4	75.4	98.4	58.2	
MW-77	pH	S. U.	*na*	7.81	7.03	6.77	6.99	7.22	6.98	7.31	7.26	7.23	7.25	
MW-77	Conductance	µmhos/cm	*na*	1,100	1,080	1,100	853	1,017	1,138	1,042	1,029	1,261	1,518	
MW-77	Temperature	°C	*na*	21.8	27.0	22.8	23.0	22.5	21.7	24.4	23.2	24.2	23.1	
MW-77	Turbidity	NTU	*na*	0.0	54.4	87.1	9.0	8.4	6.8	5.8	5.0	4.6	6.3	
MW-77A	Benzene	mg/L	*0.002*	<0.001	<0.001	<0.001	<0.00047	<0.0003	<0.00040	<0.00040	<0.001	<0.0003	<0.00023	
MW-77A	Toluene	mg/L	*0.002*	<0.001	<0.001	<0.001	<0.00049	0.00044J	<0.00042	<0.00042	<0.001	<0.0003	<0.00023	
MW-77A	Phenolics	mg/L	*0.015*	<0.05	<0.016	<0.016	<0.050	<0.050	<0.050	<0.050	0.017	<0.050	0.0073	
MW-77A	Arsenic	mg/L	*0.014*	0.0110	0.0082	0.0114	0.0124	0.0085	0.0085	0.0074	0.0073	0.0076	0.0085	
MW-77A	Chromium	mg/L	*0.026*	0.001	0.0017 J	0.0113	0.0315	0.0063	0.0493	0.0034	0.0058	0.0015	0.0030 J	
MW-77A	Lead	mg/L	*0.01*	0.004	0.003	0.0099	<0.0036	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0036	
MW-77A	Selenium	mg/L	*0.1*	0.0118	0.018	0.0165	0.0133	0.0169	0.0176	0.021	0.0218	0.0255	0.034	
MW-77A	D. O.	mg/L	na	7.9	16.8	6.7	3.3	3.1	3.4	2.8	2.7	3.1	3.8	
MW-77A	ORP	mV	na	166.0	54.0	135.0	124.9	66.2	111.5	79.6	78.1	98.1	67.2	
MW-77A	pH	S. U.	*na*	8.05	7.28	8.69	6.58	7.33	7.16	7.23	7.21	7.25	7.21	
MW-77A	Conductance	µmhos/cm	*na*	800	779	662	749	1,029	1,051	1,089	1,049	1,151	1,083	
MW-77A	Temperature	°C	*na*	21.8	24.5	26.2	24.7	23.2	21.9	23.5	22.5	23.0	21.9	
MW-77A	Turbidity	NTU	*na*	22.4	5.7	0.0	8.9	6.8	4.7	4.5	4.3	4.5	6.2	

nm - Not Measured, ns - Not Sampled, na - Not Analyzed

TABLE VI.D.1.a - 1

Site H Historical Soil-Pore Liquid Analysis

Alon USA LP - Big Spring Refinery

Cell #	Analyte	Units	Standard	Jan-95	Apr-95	Jul-95	Oct-95	Jan-96	Apr-96	Jul-96	Oct-96	Jan-97
CELL #1	Benzene	mg/L	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
CELL #2	Benzene	mg/L	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
CELL #3	Benzene	mg/L	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
CELL #4	Benzene	mg/L	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
CELL #1	Toluene	mg/L	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
CELL #2	Toluene	mg/L	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
CELL #3	Toluene	mg/L	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
CELL #4	Toluene	mg/L	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
CELL #1	Xylenes, totals	mg/L	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
CELL #2	Xylenes, totals	mg/L	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
CELL #3	Xylenes, totals	mg/L	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
CELL #4	Xylenes, totals	mg/L	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
CELL #1	Naphthalene	mg/L	0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
CELL #2	Naphthalene	mg/L	0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
CELL #3	Naphthalene	mg/L	0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
CELL #4	Naphthalene	mg/L	0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
CELL #1	Phenanthrene	mg/L	0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
CELL #2	Phenanthrene	mg/L	0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
CELL #3	Phenanthrene	mg/L	0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
CELL #4	Phenanthrene	mg/L	0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
CELL #1	Arsenic	mg/L	0.05	0.008	0.006	0.009	0.008	0.011	0.01	0.011	0.018	0.013
CELL #2	Arsenic	mg/L	0.05	0.016	0.01	0.012	0.016	0.020(1)	0.014	0.021	0.013	0.029
CELL #3	Arsenic	mg/L	0.05	0.043	0.007	0.008	0.009	0.03	0.008	0.013	0.012	0.041
CELL #4	Arsenic	mg/L	0.05	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
CELL #1	Lead	mg/L	0.401	0.035	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
CELL #2	Lead	mg/L	0.401	0.009	< 0.005	< 0.005	< 0.005	0.017	< 0.005	< 0.005	< 0.005	< 0.005
CELL #3	Lead	mg/L	0.401	< 0.005	0.007	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
CELL #4	Lead	mg/L	0.401	< 0.005	0.009	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
CELL #1	Nickel	mg/L	0.189	0.006	0.009	0.013	0.01	0.005	0.005	< 0.005	< 0.005	< 0.005
CELL #2	Nickel	mg/L	0.189	0.006	0.007	0.011	0.008	0.009	0.005	< 0.005	0.008	< 0.005
CELL #3	Nickel	mg/L	0.189	0.009	0.018	0.012	0.012	0.013	0.009	0.007	0.006	0.006
CELL #4	Nickel	mg/L	0.189	0.004	0.011	0.009	0.004	0.004	0.004	< 0.005	0.007	< 0.005
CELL #1	Selenium	mg/L	0.05	< 0.005	< 0.005	< 0.005	0.006	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
CELL #2	Selenium	mg/L	0.05	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.009	< 0.005	< 0.005
CELL #3	Selenium	mg/L	0.05	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
CELL #4	Selenium	mg/L	0.05	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005

^ - Insufficient Volume to Sample, * - Meter Issues, NR - Not in Records, na - Not Applicable

TABLE VI.D.1.a - 1

Site H Historical Soil-Pore Liquid Analysis

Alon USA LP - Big Spring Refinery

Cell #	Analyte	Units	Standard	Apr-97	Jul-97	Jan-98	Jul-98	Jan-99	Jan-00	Jul-00	Jan-01	Jan-02
CELL #1	Benzene	mg/L	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
CELL #2	Benzene	mg/L	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
CELL #3	Benzene	mg/L	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
CELL #4	Benzene	mg/L	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
CELL #1	Toluene	mg/L	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
CELL #2	Toluene	mg/L	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
CELL #3	Toluene	mg/L	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
CELL #4	Toluene	mg/L	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
CELL #1	Xylenes, totals	mg/L	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
CELL #2	Xylenes, totals	mg/L	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
CELL #3	Xylenes, totals	mg/L	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
CELL #4	Xylenes, totals	mg/L	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
CELL #1	Naphthalene	mg/L	0.01	<0.010	<0.010	<0.010	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01
CELL #2	Naphthalene	mg/L	0.01	<0.010	<0.010	<0.010	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01
CELL #3	Naphthalene	mg/L	0.01	<0.010	<0.010	<0.010	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01
CELL #4	Naphthalene	mg/L	0.01	<0.010	<0.010	<0.010	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01
CELL #1	Phenanthrene	mg/L	0.01	<0.010	<0.010	<0.010	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01
CELL #2	Phenanthrene	mg/L	0.01	<0.010	<0.010	<0.010	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01
CELL #3	Phenanthrene	mg/L	0.01	<0.010	<0.010	<0.010	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01
CELL #4	Phenanthrene	mg/L	0.01	<0.010	<0.010	<0.010	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01
CELL #1	Arsenic	mg/L	0.05	0.019	0.039	< 0.02	0.02	0.013	0.0393	0.0218	0.0158	<0.02
CELL #2	Arsenic	mg/L	0.05	0.013	0.023	< 0.02	0.04	0.035	0.0289	0.0177	0.105	<0.02
CELL #3	Arsenic	mg/L	0.05	0.023	0.032	< 0.02	0.04	0.013	0.016	0.0124	0.0221	<0.02
CELL #4	Arsenic	mg/L	0.05	< 0.005	0.005	< 0.02	<0.01	<0.005	0.00521	0.00817	0.00594	<0.02
CELL #1	Lead	mg/L	0.401	< 0.005	< 0.005	< 0.02	0.009	<0.005	0.0116	0.0114	0.0116	0.023
CELL #2	Lead	mg/L	0.401	< 0.005	< 0.005	< 0.02	0.006	<0.005	0.00892	<0.005	0.0294	0.00681
CELL #3	Lead	mg/L	0.401	< 0.005	< 0.005	< 0.02	0.008	0.006	0.147	0.00884	0.174	0.00553
CELL #4	Lead	mg/L	0.401	< 0.005	< 0.005	< 0.02	<0.005	<0.005	0.00855	<0.005	0.014	<0.005
CELL #1	Nickel	mg/L	0.189	< 0.005	< 0.005	< 0.02	<0.02	<0.02	<0.02	<0.02	0.021	<0.02
CELL #2	Nickel	mg/L	0.189	< 0.005	< 0.005	< 0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
CELL #3	Nickel	mg/L	0.189	0.006	< 0.005	< 0.02	<0.02	<0.02	<0.02	<0.02	0.0255	<0.02
CELL #4	Nickel	mg/L	0.189	< 0.005	< 0.005	< 0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
CELL #1	Selenium	mg/L	0.05	< 0.005	< 0.005	< 0.02	<0.01	<0.005	<0.005	<0.005	0.00833	<0.02
CELL #2	Selenium	mg/L	0.05	< 0.005	< 0.005	< 0.02	<0.01	<0.005	<0.005	<0.005	0.0195	<0.02
CELL #3	Selenium	mg/L	0.05	< 0.005	< 0.005	< 0.02	<0.01	<0.005	<0.005	<0.005	0.017	<0.02
CELL #4	Selenium	mg/L	0.05	< 0.005	0.013	< 0.02	<0.01	0.008	<0.005	<0.005	0.0252	<0.02

^ - Insufficient Volume to Sample, * - Meter Issues, NR - Not in Records, na - Not Applicable

TABLE VI.D.1.a - 1

Site H Historical Soil-Pore Liquid Analysis

Alon USA LP - Big Spring Refinery

Cell #	Analyte	Units	Standard	Jul-02	Jul-04	Jul-05	Jul-06	Jul-07	Jul-08	Jul-09	Jul-10	Jul-11
CELL #1	Benzene	mg/L	0.005	< 0.005	<0.050	<0.005	<0.025	<0.005	<0.005	<0.005	<0.001	<0.00025
CELL #2	Benzene	mg/L	0.005	< 0.005	<0.050	<0.005	<0.005	<0.005	<0.005	<0.005	<0.001	<0.00025
CELL #3	Benzene	mg/L	0.005	< 0.005	<0.050	<0.005	<0.005	<0.005	<0.005	<0.005	<0.001	<0.00025
CELL #4	Benzene	mg/L	0.005	< 0.005	<0.050	<0.005	<0.005	<0.005	^	<0.005	<0.001	<0.00025
CELL #1	Toluene	mg/L	0.005	< 0.005	<0.050	<0.005	<0.025	<0.005	<0.005	<0.005	<0.001	<0.00026
CELL #2	Toluene	mg/L	0.005	< 0.005	<0.050	<0.005	<0.005	<0.005	<0.005	<0.005	<0.001	<0.00026
CELL #3	Toluene	mg/L	0.005	< 0.005	<0.050	<0.005	<0.005	<0.005	<0.005	<0.005	<0.001	<0.00026
CELL #4	Toluene	mg/L	0.005	< 0.005	<0.050	<0.005	<0.005	<0.005	^	<0.005	<0.001	<0.00026
CELL #1	Xylenes, totals	mg/L	0.005	< 0.005	<0.050	<0.005	<0.025	<0.005	<0.005	<0.005	<0.001	<0.00071
CELL #2	Xylenes, totals	mg/L	0.005	< 0.005	<0.050	<0.005	<0.005	<0.005	<0.005	<0.005	<0.001	<0.00071
CELL #3	Xylenes, totals	mg/L	0.005	< 0.005	<0.050	<0.005	<0.005	<0.005	<0.005	<0.005	<0.001	<0.00071
CELL #4	Xylenes, totals	mg/L	0.005	< 0.005	<0.050	<0.005	<0.005	<0.005	^	<0.005	<0.001	<0.00071
CELL #1	Naphthalene	mg/L	0.01	< 0.01	<0.010	<0.010	<0.04	<0.01	<0.01	<0.01	<0.0054	<0.0012
CELL #2	Naphthalene	mg/L	0.01	< 0.01	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01	<0.005	<0.0012
CELL #3	Naphthalene	mg/L	0.01	< 0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.005	<0.0012
CELL #4	Naphthalene	mg/L	0.01	< 0.01	<0.010	<0.010	<0.010	<0.010	^	<0.013	<0.005	<0.0012
CELL #1	Phenanthrene	mg/L	0.01	< 0.01	<0.010	<0.010	<0.04	<0.01	<0.01	<0.01	<0.0054	<0.00099
CELL #2	Phenanthrene	mg/L	0.01	< 0.01	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01	<0.005	<0.00099
CELL #3	Phenanthrene	mg/L	0.01	< 0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.005	<0.00099
CELL #4	Phenanthrene	mg/L	0.01	< 0.01	<0.010	<0.010	<0.010	<0.010	^	<0.013	<0.005	<0.00099
CELL #1	Arsenic	mg/L	0.05	< 0.02	<0.02	<0.02	0.0139	0.00854	0.00888	0.00742	0.0094	0.0115
CELL #2	Arsenic	mg/L	0.05	< 0.02	<0.02	<0.02	<0.02	0.00522	0.00978	<0.005	<0.005	0.0032
CELL #3	Arsenic	mg/L	0.05	< 0.02	<0.02	<0.02	<0.02	0.00551	0.008	0.00549	<0.005	0.0024
CELL #4	Arsenic	mg/L	0.05	< 0.02	<0.02	<0.02	<0.02	0.00555	^	0.0152	<0.005	0.0014
CELL #1	Lead	mg/L	0.401	< 0.005	<0.005	<0.005	0.0197	0.0316	0.0148	0.0297	<0.005	<0.0018
CELL #2	Lead	mg/L	0.401	< 0.005	<0.005	<0.005	<0.005	0.0158	0.0428	<0.005	<0.005	<0.0018
CELL #3	Lead	mg/L	0.401	< 0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0018
CELL #4	Lead	mg/L	0.401	0.0726	0.00753	0.0069	0.0257	0.00772	^	0.250	<0.005	<0.0018
CELL #1	Nickel	mg/L	0.189	< 0.02	<0.02	<0.02	<0.02	0.011	0.0168	0.00853	0.0154	0.0146
CELL #2	Nickel	mg/L	0.189	< 0.02	<0.02	<0.02	<0.02	0.0111	0.0209	0.00690	<0.005	0.0032
CELL #3	Nickel	mg/L	0.189	< 0.02	<0.02	<0.02	<0.02	0.0125	0.015	0.0102	0.0051	0.0044
CELL #4	Nickel	mg/L	0.189	< 0.02	<0.02	<0.02	0.0208	0.0168	^	0.0405	<0.005	0.0055
CELL #1	Selenium	mg/L	0.05	< 0.02	<0.02	<0.02	<0.02	<0.005	0.0091	<0.005	<0.01	0.005
CELL #2	Selenium	mg/L	0.05	< 0.02	<0.02	<0.02	<0.02	<0.005	<0.005	<0.005	<0.01	0.0051
CELL #3	Selenium	mg/L	0.05	< 0.02	<0.02	<0.02	<0.02	0.0314	0.0108	<0.005	<0.01	0.007
CELL #4	Selenium	mg/L	0.05	0.0389	<0.02	0.0228	0.0221	0.0842	^	0.0175	<0.01	0.0078

^ - Insufficient Volume to Sample, * - Meter Issues, NR - Not in Records, na - Not Applicable

TABLE VI.D.1.a - 1

Site H Historical Soil-Pore Liquid Analysis

Alon USA LP - Big Spring Refinery

Cell #	Analyte	Units	Standard	Jul-12	Jul-13	Jul-14	Jul-15	Jul-16	Jul-17	Jul-18	Jul-19	Jul-20
CELL #1	Benzene	mg/L	0.005	<0.001	<0.001	0.00085 J	<0.001	<0.001	<0.001	<0.00040	<0.0010	<0.001
CELL #2	Benzene	mg/L	0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.00040	<0.0010	<0.0010
CELL #3	Benzene	mg/L	0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.00040	<0.0010	<0.0010
CELL #4	Benzene	mg/L	0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.00040	<0.0010	<0.0010
CELL #1	Toluene	mg/L	0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.00042	<0.0010	<0.001
CELL #2	Toluene	mg/L	0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.00042	<0.0010	<0.0010
CELL #3	Toluene	mg/L	0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.00042	<0.0010	<0.0010
CELL #4	Toluene	mg/L	0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.00042	<0.0010	<0.0010
CELL #1	Xylenes, totals	mg/L	0.005	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.00039	<0.0010	<0.001
CELL #2	Xylenes, totals	mg/L	0.005	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.00039	<0.0010	<0.0010
CELL #3	Xylenes, totals	mg/L	0.005	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.00039	<0.0010	<0.0010
CELL #4	Xylenes, totals	mg/L	0.005	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.00039	<0.0010	<0.0010
CELL #1	Naphthalene	mg/L	0.01	<0.0051	<0.0051	<0.0051	<0.0051	<0.0051	0.0042J	<0.0018	<0.0051	0.0013 J
CELL #2	Naphthalene	mg/L	0.01	<0.0051	<0.0051	<0.0051	<0.0051	<0.0051	0.0039J	<0.0018	<0.0051	<0.0050
CELL #3	Naphthalene	mg/L	0.01	<0.0051	<0.0051	<0.0051	<0.0051	<0.0051	0.003J	<0.0018	<0.0052	<0.0050
CELL #4	Naphthalene	mg/L	0.01	<0.0052	<0.0051	<0.0051	<0.0051	<0.0051	<0.0023	<0.0018	<0.0052	<0.0050
CELL #1	Phenanthrene	mg/L	0.01	<0.0051	<0.0051	<0.0051	<0.0051	<0.0051	<0.0053	<0.0019	<0.0051	<0.005
CELL #2	Phenanthrene	mg/L	0.01	<0.0051	<0.0051	<0.0051	<0.0051	<0.0051	<0.0053	<0.0019	<0.0051	<0.0050
CELL #3	Phenanthrene	mg/L	0.01	<0.0051	<0.0051	<0.0051	<0.0051	<0.0051	<0.0052	<0.0019	<0.0052	<0.0050
CELL #4	Phenanthrene	mg/L	0.01	<0.0052	<0.0051	<0.0051	<0.0051	<0.0051	<0.0052	<0.0019	<0.0052	<0.0050
CELL #1	Arsenic	mg/L	0.05	0.0141	0.0015	0.0171	0.0136	<0.005	0.0033	0.0038	0.0028	0.0032
CELL #2	Arsenic	mg/L	0.05	<0.005	0.0015	<0.005	0.0057	<0.005	0.0028	0.0031	0.0023	0.0022
CELL #3	Arsenic	mg/L	0.05	<0.005	0.0011	0.0067	0.0049 J	<0.005	0.0027	0.0027	0.0019	0.0022
CELL #4	Arsenic	mg/L	0.05	<0.005	0.0019	<0.005	<0.0047	<0.005	0.002	0.0018	0.0012	0.0012
CELL #1	Lead	mg/L	0.401	<0.003	<0.005	<0.003	<0.0039	<0.0036	0.0023	0.00027J	.00037J	<0.00083
CELL #2	Lead	mg/L	0.401	<0.003	<0.005	0.0043	0.0012 J	<0.0036	0.0026	0.00074J	0.0005J	<0.00083
CELL #3	Lead	mg/L	0.401	<0.003	<0.005	0.0026 J	0.002 J	<0.0036	0.0042	0.00091J	0.0004J	<0.00083
CELL #4	Lead	mg/L	0.401	<0.003	<0.005	0.0016 J	<0.00077	0.0046J	0.003	0.001	0.00036J	<0.00083
CELL #1	Nickel	mg/L	0.189	<0.04	0.0031	0.0177 J	0.0189 J	<0.0018	<0.001	0.0021	0.0016	0.0016
CELL #2	Nickel	mg/L	0.189	<0.04	0.0042	0.0037 J	0.0027 J	<0.0018	<0.001	0.003	0.0025	0.0021
CELL #3	Nickel	mg/L	0.189	<0.04	0.0054	0.0054 J	0.0044 J	<0.0018	<0.001	0.0027	0.0016	0.0017
CELL #4	Nickel	mg/L	0.189	<0.04	0.0031	0.0037 J	0.0021 J	<0.0018	<0.001	0.0022	0.0014	0.0013
CELL #1	Selenium	mg/L	0.05	0.0052	0.0069	0.013 J	0.0178	0.0165J	<0.0053	0.0042J	<0.010	0.0047 J
CELL #2	Selenium	mg/L	0.05	<0.005	0.0091	0.0087	0.0088	0.0346	<0.0053	0.0043J	0.0031J	0.0037 J
CELL #3	Selenium	mg/L	0.05	<0.005	0.0084	0.0082	0.0064	0.00228	<0.0052	0.0043J	<0.0031	0.0030 J
CELL #4	Selenium	mg/L	0.05	<0.005	0.0079	0.0067	0.0056	0.0227	<0.0052	<0.0031	<0.0031	0.0013 J

^ - Insufficient Volume to Sample, * - Meter Issues, NR - Not in Records, na - Not Applicable

TABLE VI.D.1.a - 1

Site H Historical Soil-Pore Liquid Analysis

Alon USA LP - Big Spring Refinery

Cell #	Analyte	Units	Standard	Jul-21	Jul-22	Jul-23
CELL #1	Benzene	mg/L	0.005	<0.0010	<0.0010	<0.00023
CELL #2	Benzene	mg/L	0.005	<0.0010	<0.0010	<0.00023
CELL #3	Benzene	mg/L	0.005	<0.0010	<0.0010	<0.00023
CELL #4	Benzene	mg/L	0.005	<0.0010	<0.0010	<0.00023
CELL #1	Toluene	mg/L	0.005	<0.0010	<0.0010	<0.00023
CELL #2	Toluene	mg/L	0.005	<0.0010	<0.0010	<0.00023
CELL #3	Toluene	mg/L	0.005	<0.0010	<0.0010	<0.00023
CELL #4	Toluene	mg/L	0.005	<0.0010	<0.0010	<0.00023
CELL #1	Xylenes, totals	mg/L	0.005	<0.0010	<0.0010	<0.00039
CELL #2	Xylenes, totals	mg/L	0.005	<0.0010	<0.0010	<0.00039
CELL #3	Xylenes, totals	mg/L	0.005	<0.0010	<0.0010	<0.00039
CELL #4	Xylenes, totals	mg/L	0.005	<0.0010	<0.0010	<0.00039
CELL #1	Naphthalene	mg/L	0.01	<0.0051	0.00059	<0.000076
CELL #2	Naphthalene	mg/L	0.01	<0.0050	0.00042	<0.000075
CELL #3	Naphthalene	mg/L	0.01	<0.0050	0.00059	<0.000075
CELL #4	Naphthalene	mg/L	0.01	<0.0050	0.00019	<0.000075
CELL #1	Phenanthrene	mg/L	0.01	<0.0051	0.00015 J	<0.000059
CELL #2	Phenanthrene	mg/L	0.01	<0.0050	0.00016 J	<0.000059
CELL #3	Phenanthrene	mg/L	0.01	<0.0050	0.00010 J	<0.000059
CELL #4	Phenanthrene	mg/L	0.01	<0.0050	0.000067 J	<0.000059
CELL #1	Arsenic	mg/L	0.05	0.0026	0.0028 J	0.0028 J
CELL #2	Arsenic	mg/L	0.05	0.0025	<0.0028	<0.0028
CELL #3	Arsenic	mg/L	0.05	0.002	<0.0028	<0.0028
CELL #4	Arsenic	mg/L	0.05	0.0013	<0.0028	<0.0028
CELL #1	Lead	mg/L	0.401	<0.00072	<0.0036	<0.0036
CELL #2	Lead	mg/L	0.401	<0.00072	<0.0036	<0.0036
CELL #3	Lead	mg/L	0.401	<0.00072	<0.0036	<0.0036
CELL #4	Lead	mg/L	0.401	0.00079 J	<0.0036	<0.0036
CELL #1	Nickel	mg/L	0.189	0.0014	<0.0026	<0.0026
CELL #2	Nickel	mg/L	0.189	0.0018	<0.0026	<0.0026
CELL #3	Nickel	mg/L	0.189	0.0014	<0.0026	<0.0026
CELL #4	Nickel	mg/L	0.189	0.0017	0.0042 J	<0.0026
CELL #1	Selenium	mg/L	0.05	0.004 J	<0.014	<0.014
CELL #2	Selenium	mg/L	0.05	0.0038 J	<0.014	<0.014
CELL #3	Selenium	mg/L	0.05	0.0035 J	<0.014	<0.014
CELL #4	Selenium	mg/L	0.05	<0.0028	<0.014	<0.014

^ - Insufficient Volume to Sample, * - Meter Issues, NR - Not in Records, na - Not Applicable

TABLE VI.D.1.a - 1

Site H Historical Soil-Pore Liquid Analysis

Alon USA LP - Big Spring Refinery

Cell #	Analyte	Units	Standard	Jan-95	Apr-95	Jul-95	Oct-95	Jan-96	Apr-96	Jul-96	Oct-96	Jan-97
CELL #1	Chromium, hex.	mg/L	0.1	< 0.01	< 0.01	< 0.01	< 0.01	< 0.10(2)	< 0.02(2)	* < 0.02	< 0.01	* < 0.02
CELL #2	Chromium, hex.	mg/L	0.1	< 0.01	< 0.01	< 0.01	< 0.01	< 0.10(2)	< 0.02(2)	* < 0.02	< 0.01	* < 0.02
CELL #3	Chromium, hex.	mg/L	0.1	< 0.01	< 0.01	< 0.01	< 0.01	< 0.10(2)	< 0.02(2)	* < 0.02	< 0.01	* < 0.02
CELL #4	Chromium, hex.	mg/L	0.1	< 0.01	< 0.01	< 0.01	< 0.01	< 0.10(2)	< 0.01	< 0.01	< 0.01	* < 0.02
CELL #1	pH	S.U.	na	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL #2	pH	S.U.	na	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL #3	pH	S.U.	na	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL #4	pH	S.U.	na	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL #1	Specific Conduc.	ms/cm	na	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL #2	Specific Conduc.	ms/cm	na	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL #3	Specific Conduc.	ms/cm	na	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL #4	Specific Conduc.	ms/cm	na	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL #1	Temperature	°C	na	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL #2	Temperature	°C	na	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL #3	Temperature	°C	na	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL #4	Temperature	°C	na	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL #1	Turbidity	NTU	na	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL #2	Turbidity	NTU	na	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL #3	Turbidity	NTU	na	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL #4	Turbidity	NTU	na	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL #1	Leachate Depth	ft-TOC	na	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL #2	Leachate Depth	ft-TOC	na	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL #3	Leachate Depth	ft-TOC	na	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL #4	Leachate Depth	ft-TOC	na	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL #1	Collector Depth	ft-TOC	na	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL #2	Collector Depth	ft-TOC	na	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL #3	Collector Depth	ft-TOC	na	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL #4	Collector Depth	ft-TOC	na	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL #1	Leachate Height	feet	na	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL #2	Leachate Height	feet	na	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL #3	Leachate Height	feet	na	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL #4	Leachate Height	feet	na	NR	NR	NR	NR	NR	NR	NR	NR	NR

^ - Insufficient Volume to Sample, * - Meter Issues, NR - Not in Records, na - Not Applicable

TABLE VI.D.1.a - 1

Site H Historical Soil-Pore Liquid Analysis

Alon USA LP - Big Spring Refinery

Cell #	Analyte	Units	Standard	Apr-97	Jul-97	Jan-98	Jul-98	Jan-99	Jan-00	Jul-00	Jan-01	Jan-02
CELL #1	Chromium, hex.	mg/L	0.1	* < 0.05	< 0.01	< 0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
CELL #2	Chromium, hex.	mg/L	0.1	* < 0.05	< 0.01	< 0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
CELL #3	Chromium, hex.	mg/L	0.1	* < 0.05	< 0.01	< 0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
CELL #4	Chromium, hex.	mg/L	0.1	* < 0.05	< 0.01	< 0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
CELL #1	pH	S.U.	na	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL #2	pH	S.U.	na	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL #3	pH	S.U.	na	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL #4	pH	S.U.	na	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL #1	Specific Conduc.	ms/cm	na	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL #2	Specific Conduc.	ms/cm	na	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL #3	Specific Conduc.	ms/cm	na	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL #4	Specific Conduc.	ms/cm	na	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL #1	Temperature	°C	na	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL #2	Temperature	°C	na	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL #3	Temperature	°C	na	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL #4	Temperature	°C	na	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL #1	Turbidity	NTU	na	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL #2	Turbidity	NTU	na	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL #3	Turbidity	NTU	na	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL #4	Turbidity	NTU	na	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL #1	Leachate Depth	ft-TOC	na	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL #2	Leachate Depth	ft-TOC	na	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL #3	Leachate Depth	ft-TOC	na	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL #4	Leachate Depth	ft-TOC	na	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL #1	Collector Depth	ft-TOC	na	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL #2	Collector Depth	ft-TOC	na	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL #3	Collector Depth	ft-TOC	na	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL #4	Collector Depth	ft-TOC	na	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL #1	Leachate Height	feet	na	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL #2	Leachate Height	feet	na	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL #3	Leachate Height	feet	na	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL #4	Leachate Height	feet	na	NR	NR	NR	NR	NR	NR	NR	NR	NR

^ - Insufficient Volume to Sample, * - Meter Issues, NR - Not in Records, na - Not Applicable

TABLE VI.D.1.a - 1

Site H Historical Soil-Pore Liquid Analysis

Alon USA LP - Big Spring Refinery

Cell #	Analyte	Units	Standard	Jul-02	Jul-04	Jul-05	Jul-06	Jul-07	Jul-08	Jul-09	Jul-10	Jul-11
CELL #1	Chromium, hex.	mg/L	0.1	< 0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.008
CELL #2	Chromium, hex.	mg/L	0.1	< 0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.008
CELL #3	Chromium, hex.	mg/L	0.1	< 0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.009
CELL #4	Chromium, hex.	mg/L	0.1	< 0.05	<0.01	<0.01	<0.01	<0.01	^	<0.01	<0.01	0.007
CELL #1	pH	S.U.	na	NR	7.10	6.99	7.34	6.84	6.60	7.20	7.21	8.73
CELL #2	pH	S.U.	na	NR	7.20	6.89	7.23	6.86	6.48	7.21	7.28	8.48
CELL #3	pH	S.U.	na	NR	7.21	6.89	7.09	6.38	6.68	7.01	7.23	8.44
CELL #4	pH	S.U.	na	NR	7.04	6.98	7.00	6.44	^	7.21	7.11	8.40
CELL #1	Specific Conduc.	ms/cm	na	NR	1.98	3.10	3.29	5.18	7.01	3.10	2.25	3.19
CELL #2	Specific Conduc.	ms/cm	na	NR	1.10	3.45	2.31	6.76	5.86	3.21	1.85	4.55
CELL #3	Specific Conduc.	ms/cm	na	NR	7.56	4.67	8.12	9.55	8.89	4.99	4.83	5.97
CELL #4	Specific Conduc.	ms/cm	na	NR	1.99	6.53	7.12	12.71	^	2.76	3.59	4.94
CELL #1	Temperature	°C	na	NR	25.64	25.91	25.84	24.72	26.10	26.80	27.35	29.24
CELL #2	Temperature	°C	na	NR	25.16	25.53	25.00	24.89	25.78	25.68	27.54	26.58
CELL #3	Temperature	°C	na	NR	24.64	25.03	24.82	24.79	25.88	25.90	27.24	25.03
CELL #4	Temperature	°C	na	NR	26.91	26.48	25.49	25.09	^	28.06	29.95	27.09
CELL #1	Turbidity	NTU	na	NR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CELL #2	Turbidity	NTU	na	NR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.8
CELL #3	Turbidity	NTU	na	NR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.0
CELL #4	Turbidity	NTU	na	NR	0.0	0.0	0.0	0.0	^	0.0	0.0	8.7
CELL #1	Leachate Depth	ft-TOC	na	NR	4.67	5.30	5.50	1.75	4.55	6.82	5.05	12.09
CELL #2	Leachate Depth	ft-TOC	na	NR	5.06	4.60	4.80	2.81	5.65	5.82	5.91	10.33
CELL #3	Leachate Depth	ft-TOC	na	NR	7.45	7.29	5.20	3.25	6.10	7.03	7.85	8.93
CELL #4	Leachate Depth	ft-TOC	na	NR	8.35	8.66	10.27	12.69	15.30	8.78	9.55	8.42
CELL #1	Collector Depth	ft-TOC	na	NR	12.78	12.68	12.71	13.21	12.84	13.10	12.24	15.20
CELL #2	Collector Depth	ft-TOC	na	NR	15.32	15.42	15.30	15.35	15.30	15.45	15.53	14.86
CELL #3	Collector Depth	ft-TOC	na	NR	15.07	15.09	15.11	15.08	15.11	15.09	15.14	15.45
CELL #4	Collector Depth	ft-TOC	na	NR	15.92	16.07	16.03	15.75	16.00	15.94	16.04	13.62
CELL #1	Leachate Height	feet	na	NR	8.11	7.38	7.21	11.46	8.29	6.28	7.19	3.11
CELL #2	Leachate Height	feet	na	NR	10.26	10.82	10.50	12.54	9.65	9.63	9.62	4.48
CELL #3	Leachate Height	feet	na	NR	7.62	7.80	9.91	11.83	9.01	8.06	7.29	6.52
CELL #4	Leachate Height	feet	na	NR	7.57	7.41	5.76	3.06	0.70	7.16	6.49	5.20

^ - Insufficient Volume to Sample, * - Meter Issues, NR - Not in Records, na - Not Applicable

TABLE VI.D.1.a - 1

Site H Historical Soil-Pore Liquid Analysis

Alon USA LP - Big Spring Refinery

Cell #	Analyte	Units	Standard	Jul-12	Jul-13	Jul-14	Jul-15	Jul-16	Jul-17	Jul-18	Jul-19	Jul-20
CELL #1	Chromium, hex.	mg/L	0.1	<0.01	0.002	0.002 J	<0.002	<0.01	<0.01	0.0070J	0.0036J	<0.010
CELL #2	Chromium, hex.	mg/L	0.1	<0.01	0.006	0.002 J	<0.002	<0.01	<0.01	<0.0060	<0.010	<0.010
CELL #3	Chromium, hex.	mg/L	0.1	<0.01	0.003	0.003 J	<0.002	<0.01	<0.01	<0.0060	<0.010	<0.010
CELL #4	Chromium, hex.	mg/L	0.1	<0.01	0.002	0.002 J	<0.002	<0.01	<0.01	<0.0060	<0.010	<0.010
CELL #1	pH	S.U.	na	8.41	7.49	10.97*	11.69*	6.48	7.61	7.59	7.64	7.12
CELL #2	pH	S.U.	na	8.19	7.29	10.97	11.12*	6.56	7.54	7.23	7.40	6.92
CELL #3	pH	S.U.	na	7.87	7.47	7.99	11.30*	6.26	7.35	7.75	6.94	6.48
CELL #4	pH	S.U.	na	7.71	7.38	8.01	11.37*	6.22	7.13	7.19	6.50	5.38
CELL #1	Specific Conduc.	ms/cm	na	15.70	3.95	1.30	1.13	2.69	3.27	3.41	2.45	2.01
CELL #2	Specific Conduc.	ms/cm	na	4.86	4.37	13.00	2.94	3.52	3.68	3.61	2.66	1.87
CELL #3	Specific Conduc.	ms/cm	na	5.27	3.80	3.18	2.61	2.81	2.78	2.72	2.06	1.98
CELL #4	Specific Conduc.	ms/cm	na	4.42	2.13	1.53	1.32	1.63	1.58	1.59	0.96	0.70
CELL #1	Temperature	°C	na	26.83	29.54	29.35	25.32	28.62	25.53	28.13	26.31	26.87
CELL #2	Temperature	°C	na	25.41	28.59	29.35	26.04	25.68	25.27	26.60	25.87	26.74
CELL #3	Temperature	°C	na	26.12	29.71	24.77	25.88	26.45	25.85	26.84	25.95	26.89
CELL #4	Temperature	°C	na	26.94	31.21	29.30	26.50	29.66	26.86	27.45	26.11	26.95
CELL #1	Turbidity	NTU	na	1.3	0.0	2.2	0.0	0.0	2.4	0.0	0.0	0.0
CELL #2	Turbidity	NTU	na	3.1	0.0	2.2	0.0	0.0	0.0	0.0	0.1	0.0
CELL #3	Turbidity	NTU	na	9.8	18.8	30.2	0.0	0.0	0.0	0.3	0.0	0.0
CELL #4	Turbidity	NTU	na	10.5	5.9	0.0	0.0	0.0	0.0	1.4	0.0	0.0
CELL #1	Leachate Depth	ft-TOC	na	7.95	7.48	7.26	4.14	5.41	6.20	7.95	5.54	4.81
CELL #2	Leachate Depth	ft-TOC	na	8.92	7.85	7.26	4.65	5.74	6.54	8.31	5.92	4.41
CELL #3	Leachate Depth	ft-TOC	na	9.30	9.28	8.15	6.49	7.16	8.01	9.73	7.21	6.70
CELL #4	Leachate Depth	ft-TOC	na	10.71	11.01	11.61	8.22	8.91	9.75	11.45	9.10	8.45
CELL #1	Collector Depth	ft-TOC	na	12.23	15.52	12.28	12.40	13.61	13.91	15.25	15.01	13.74
CELL #2	Collector Depth	ft-TOC	na	13.58	15.49	12.20	15.60	15.54	14.41	15.45	14.87	13.82
CELL #3	Collector Depth	ft-TOC	na	15.16	15.13	15.50	15.30	13.72	15.40	15.13	15.16	13.43
CELL #4	Collector Depth	ft-TOC	na	13.30	16.05	16.02	16.18	16.02	14.45	15.76	16.12	16.19
CELL #1	Leachate Height	feet	na	4.28	8.04	5.02	8.26	8.20	7.71	7.30	9.47	8.93
CELL #2	Leachate Height	feet	na	4.66	7.64	5.02	10.95	9.80	7.87	7.14	8.95	9.41
CELL #3	Leachate Height	feet	na	5.86	8.85	7.35	8.81	6.56	7.39	5.40	7.98	6.73
CELL #4	Leachate Height	feet	na	2.59	5.04	4.41	7.96	7.11	4.70	4.31	7.02	7.74

^ - Insufficient Volume to Sample, * - Meter Issues, NR - Not in Records, na - Not Applicable

TABLE VI.D.1.a - 1

Site H Historical Soil-Pore Liquid Analysis

Alon USA LP - Big Spring Refinery

Cell #	Analyte	Units	Standard	Jul-21	Jul-22	Jul-23
CELL #1	Chromium, hex.	mg/L	0.1	<0.010	<0.0028	<0.0028
CELL #2	Chromium, hex.	mg/L	0.1	<0.010	<0.0028	<0.0028
CELL #3	Chromium, hex.	mg/L	0.1	<0.010	<0.0028	<0.0028
CELL #4	Chromium, hex.	mg/L	0.1	<0.010	<0.0028	<0.0028
CELL #1	pH	S.U.	na	7.29	8.47	6.98
CELL #2	pH	S.U.	na	7.13	7.39	6.32
CELL #3	pH	S.U.	na	6.98	8.30	7.13
CELL #4	pH	S.U.	na	6.26	8.12	6.50
CELL #1	Specific Conduc.	ms/cm	na	2.17	1.74	1.47
CELL #2	Specific Conduc.	ms/cm	na	2.35	1.99	1.08
CELL #3	Specific Conduc.	ms/cm	na	1.79	1.49	1.22
CELL #4	Specific Conduc.	ms/cm	na	0.61	0.52	0.88
CELL #1	Temperature	°C	na	26.03	32.01	29.51
CELL #2	Temperature	°C	na	25.85	30.47	28.10
CELL #3	Temperature	°C	na	25.64	29.51	26.85
CELL #4	Temperature	°C	na	25.57	28.89	26.03
CELL #1	Turbidity	NTU	na	0.0	2.4	1.3
CELL #2	Turbidity	NTU	na	0.0	2.3	0.0
CELL #3	Turbidity	NTU	na	0.0	0.0	5.4
CELL #4	Turbidity	NTU	na	0.0	3.4	6.7
CELL #1	Leachate Depth	ft-TOC	na	5.93	7.15	7.80
CELL #2	Leachate Depth	ft-TOC	na	6.25	7.55	8.20
CELL #3	Leachate Depth	ft-TOC	na	7.62	8.95	9.56
CELL #4	Leachate Depth	ft-TOC	na	9.36	10.84	11.25
CELL #1	Collector Depth	ft-TOC	na	13.91	13.90	13.90
CELL #2	Collector Depth	ft-TOC	na	14.42	15.19	14.80
CELL #3	Collector Depth	ft-TOC	na	13.48	15.13	14.61
CELL #4	Collector Depth	ft-TOC	na	15.75	16.04	16.10
CELL #1	Leachate Height	feet	na	7.98	8.35	6.10
CELL #2	Leachate Height	feet	na	8.17	7.64	6.60
CELL #3	Leachate Height	feet	na	5.86	6.18	5.05
CELL #4	Leachate Height	feet	na	6.39	5.16	4.85

^ - Insufficient Volume to Sample, * - Meter Issues, NR - Not in Records, na - Not Applicable

Table VI.D.1.A - 2
SITE H HISTORICAL SOIL-CORE SOIL ANALYSIS
Alon USA LP - Big Spring Refinery

CELL #	Depth	Analyte	Standard	Jan-95	Jul-95	Jan-96	Jul-96	Jan-97	Jul-97	Jan-98	Jul-98	Jan-99	Jul-04	Jul-05	Jul-06	Jul-07	Jul-08	Jul-09	Jul-10	Jul-11	Jul-12	Jul-13
CELL-1-N	0" - 12"	Arsenic	(mg/g)	11.2	11.4	9.6	9.6	13	6.9	8	5	6.3	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	0" - 12"	Chromium	(mg/g)	106	354	134	134	230	16	29	25	<0.3	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	0" - 12"	Lead	(mg/g)	46.3	118	** 121	** 121	85	18	19	16.4	<0.3	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	0" - 12"	Nickel	(mg/g)	8.5	14.7	10.8	10.8	19	5.2	5.1	3.4	16	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	0" - 12"	Selenium	(mg/g)	14.6	5	6.9	6.9	4.8	<0.5	<0.50	<1	2.7	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	0" - 12"	Benzene	(mg/g)	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.2	<0.20	<0.025	4	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	0" - 12"	Toluene	(mg/g)	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.2	<0.20	0.03	12.8	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	0" - 12"	Xylenes, totals	(mg/g)	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.2	<0.20	0.12	<0.5	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	0" - 12"	Naphthalene	(mg/g)	* < 4.0	* < 9	3	3	< 0.3	<0.3	* <0.60	<33	11	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	0" - 12"	Phenanthrene	(mg/g)	* < 4.0	19	22	22	0.72	<0.3	2.4	<33	850	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	0" - 12"	Beryllium	(mg/g)	0.2	0.3	0.2	0.2	< 1.0	0.2	0.26	<0.3	9.2	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	0" - 12"	Cadmium	(mg/g)	0.2	0.4	< 0.1	< 0.1	< 1.0	0.3	0.11	<0.05	21	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	0" - 12"	Copper	(mg/g)	13.4	21.4	13.8	13.8	18	4.2	3.2	3.5	<0.005	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	0" - 12"	Vanadium	(mg/g)	10.3	18.8	12.7	12.7	16	7.3	7.8	8.7	<0.005	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	0" - 12"	Zinc	(mg/g)	119	184	95.2	95.2	160	25	35	34	<0.005	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	0" - 12"	Kjeldahl Nitrogen	(mg/g)	840	NR	NR	NR	382	NA	250	NA	<2.6	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	0" - 12"	TOC	(mg/g)	10200	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	0" - 12"	Solids	% wt	NR	NR	NR	NR	NR	NR	NR	NR	89	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	0" - 12"	pH	(stnd units)	7.8	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	0" - 12"	Specific Conductar	(µmho/cm)	3670	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	0" - 12"	Moisture	(%)	88	NR	NR	NR	13.9	NR	9.08	NA	<2.6	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	12"-33"	Arsenic	(mg/g)	3.5	10.7	11.4	11.4	4.3	3	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	12"-33"	Chromium	(mg/g)	36.8	390	296	296	66	17	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	12"-33"	Lead	(mg/g)	39.8	120	104	104	89	5.1	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	12"-33"	Nickel	(mg/g)	5.7	22	13	13	11	12	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	12"-33"	Selenium	(mg/g)	< 0.5	5.3	5.2	5.2	< 1.0	<0.5	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	12"-33"	Benzene	(mg/g)	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.2	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	12"-33"	Toluene	(mg/g)	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.2	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	12"-33"	Xylenes, totals	(mg/g)	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.2	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	12"-33"	Naphthalene	(mg/g)	* < 4.0	* < 4	< 0.3	< 0.3	< 0.3	<0.3	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	12"-33"	Phenanthrene	(mg/g)	* < 4.0	* < 4	1.2	1.2	2.8	<0.3	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	12"-33"	Beryllium	(mg/g)	NR	0.3	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	12"-33"	Cadmium	(mg/g)	NR	0.4	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	12"-33"	Copper	(mg/g)	NR	21.6	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	12"-33"	Vanadium	(mg/g)	NR	19	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	12"-33"	Zinc	(mg/g)	NR	201	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	12"-33"	Kjeldahl Nitrogen	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	12"-33"	TOC	(mg/g)	8100	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	12"-33"	Solids	% wt	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	12"-33"	pH	(stnd units)	8.1	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	12"-33"	Specific Conductar	(µmho/cm)	1670	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	12"-33"	Moisture	(%)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR

NA - Not Analyzed, NR - Not Required

Table VI.D.1.A - 2
SITE H HISTORICAL SOIL-CORE SOIL ANALYSIS
Alon USA LP - Big Spring Refinery

CELL #	Depth	Analyte	Standard	Jul-14	Jul-15	Jul-16	Jul-17	Jul-18	Jul-19	Jul-20	Jul-21	Jul-22	Jul-23
CELL-1-N	0" - 12"	Arsenic	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	0" - 12"	Chromium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	0" - 12"	Lead	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	0" - 12"	Nickel	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	0" - 12"	Selenium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	0" - 12"	Benzene	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	0" - 12"	Toluene	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	0" - 12"	Xylenes, totals	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	0" - 12"	Naphthalene	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	0" - 12"	Phenanthrene	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	0" - 12"	Beryllium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	0" - 12"	Cadmium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	0" - 12"	Copper	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	0" - 12"	Vanadium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	0" - 12"	Zinc	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	0" - 12"	Kjeldahl Nitrogen	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	0" - 12"	TOC	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	0" - 12"	Solids	% wt	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	0" - 12"	pH	(stnd units)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	0" - 12"	Specific Conductar	(µmho/cm)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	0" - 12"	Moisture	(%)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	12"-33"	Arsenic	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	12"-33"	Chromium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	12"-33"	Lead	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	12"-33"	Nickel	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	12"-33"	Selenium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	12"-33"	Benzene	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	12"-33"	Toluene	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	12"-33"	Xylenes, totals	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	12"-33"	Naphthalene	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	12"-33"	Phenanthrene	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	12"-33"	Beryllium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	12"-33"	Cadmium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	12"-33"	Copper	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	12"-33"	Vanadium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	12"-33"	Zinc	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	12"-33"	Kjeldahl Nitrogen	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	12"-33"	TOC	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	12"-33"	Solids	% wt	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	12"-33"	pH	(stnd units)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	12"-33"	Specific Conductar	(µmho/cm)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	12"-33"	Moisture	(%)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR

NA - Not Analyzed, NR - Not Required

Table VI.D.1.A - 2
SITE H HISTORICAL SOIL-CORE SOIL ANALYSIS
Alon USA LP - Big Spring Refinery

CELL #	Depth	Analyte	Standard	Jan-95	Jul-95	Jan-96	Jul-96	Jan-97	Jul-97	Jan-98	Jul-98	Jan-99	Jul-04	Jul-05	Jul-06	Jul-07	Jul-08	Jul-09	Jul-10	Jul-11	Jul-12	Jul-13
CELL-1-N	33"-54"	Arsenic	(mg/g)	2.3	2	1.6	1.6	1.9	2.5	< 0.50	3	2.5	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	33"-54"	Chromium	(mg/g)	6.9	14.3	3.6	3.6	10	12.6	13	4	NA	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	33"-54"	Lead	(mg/g)	5.7	30.8	4.1	4.1	6	3	6.5	7.9	NA	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	33"-54"	Nickel	(mg/g)	7.6	4.3	6.8	6.8	12	12.6	14	6.6	20.5	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	33"-54"	Selenium	(mg/g)	< 0.5	< 0.5	0.5	0.5	< 1.0	<0.5	<0.50	<1	NA	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	33"-54"	Benzene	(mg/g)	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.2	<0.20	<0.005	13.3	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	33"-54"	Toluene	(mg/g)	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.2	<0.20	<0.005	8.2	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	33"-54"	Xylenes, totals	(mg/g)	< 0.2	0.8	< 0.2	< 0.2	< 0.2	<0.2	<0.20	<0.005	<0.001	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	33"-54"	Naphthalene	(mg/g)	< 0.3	* < 0.9	< 0.3	< 0.3	< 0.3	<0.3	<0.30	<0.33	12	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	33"-54"	Phenanthrene	(mg/g)	< 0.3	7.4	< 0.3	< 0.3	< 0.3	<0.3	<0.30	<0.33	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	33"-54"	Beryllium	(mg/g)	NR	0.3	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	33"-54"	Cadmium	(mg/g)	NR	< 0.1	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	33"-54"	Copper	(mg/g)	NR	3.1	NR	NR	NR	NR	NR	NR	<0.005	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	33"-54"	Vanadium	(mg/g)	NR	6.9	NR	NR	NR	NR	NR	NR	<0.005	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	33"-54"	Zinc	(mg/g)	NR	21.1	NR	NR	NR	NR	NR	NR	<0.005	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	33"-54"	Kjeldahl Nitrogen	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	<0.33	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	33"-54"	TOC	(mg/g)	490	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	33"-54"	Solids	% wt	NR	NR	NR	NR	NR	NR	NR	NR	88	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	33"-54"	pH	(stnd units)	7.8	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	33"-54"	Specific Conductar	(µmho/cm)	1440	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	33"-54"	Moisture	(%)	NR	NR	NR	NR	NR	NR	NR	NR	<0.33	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	54"-60"	Arsenic	(mg/g)	2.7	1.9	1.1	1.1	2	2.3	< 0.50	2	2.5	3.27	5.29	3.42	2.46	3.73	2.22	2.99	1.9	3.2	4.5
CELL-1-N	54"-60"	Chromium	(mg/g)	7.2	4.9	4.2	4.2	15	12.6	15	6	NA	10.7	18.5	17	10.8	9.08	7.28	12.8	13.3	21.5	20.8
CELL-1-N	54"-60"	Lead	(mg/g)	6.4	4.5	5.8	5.8	9.1	2.5	7.5	7.3	NA	8.26	12.5	10.4	7.52	5.93	5.16	7.6	7.4	10.7	10.2
CELL-1-N	54"-60"	Nickel	(mg/g)	7.5	7	6.9	6.9	8.7	11.7	12	10	18	13.4	20.5	16.6	15	9.55	8.32	11.4	12.6	15.8	19.1
CELL-1-N	54"-60"	Selenium	(mg/g)	< 0.5	< 0.5	< 0.5	< 0.5	< 1.0	<0.5	<0.50	<1	NA	<0.5	<0.5	<0.5	<0.5	<0.5	1.56	<0.5	<0.19	0.29	0.47
CELL-1-N	54"-60"	Benzene	(mg/g)	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.2	<0.20	<0.005	12.8	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.005	<0.0042	<0.0044	<0.0042
CELL-1-N	54"-60"	Toluene	(mg/g)	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.2	<0.20	<0.005	7.3	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.005	<0.0042	<0.0044	<0.0042
CELL-1-N	54"-60"	Xylenes	(mg/g)	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.2	<0.20	<0.005	<0.5	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.005	<0.012	<0.013	<0.013
CELL-1-N	54"-60"	Naphthalene	(mg/g)	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	<0.3	<0.30	<0.33	10	<0.3	<0.3	<0.3	<0.3	<0.3	<0.17	<0.17	<0.19	<0.20	<0.19
CELL-1-N	54"-60"	Phenanthrene	(mg/g)	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	<0.3	<0.30	<0.33	NA	<0.3	<0.3	<0.3	<0.3	<0.3	<0.17	<0.17	<0.19	<0.20	<0.19
CELL-1-N	54"-60"	Beryllium	(mg/g)	NR	0.4	NR	NR	NR	NR	NR	NR	NA	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	54"-60"	Cadmium	(mg/g)	NR	0.1	NR	NR	NR	NR	NR	NR	NA	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	54"-60"	Copper	(mg/g)	NR	4.7	NR	NR	NR	NR	NR	NR	<0.005	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	54"-60"	Vanadium	(mg/g)	NR	8.4	NR	NR	NR	NR	NR	NR	<0.005	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	54"-60"	Zinc	(mg/g)	NR	9.3	NR	NR	NR	NR	NR	NR	<0.005	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	54"-60"	Kjeldahl Nitrogen	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	<0.33	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	54"-60"	TOC	(mg/g)	640	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	54"-60"	Solids	% wt	NR	NR	NR	NR	NR	NR	NR	NR	90	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	54"-60"	pH	(stnd units)	7.9	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	54"-60"	Specific Conductar	(µmho/cm)	1140	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	54"-60"	Moisture	(%)	NR	NR	NR	NR	NR	NR	NR	NR	<0.33	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR

NA - Not Analyzed, NR - Not Required

Table VI.D.1.A - 2
SITE H HISTORICAL SOIL-CORE SOIL ANALYSIS
Alon USA LP - Big Spring Refinery

CELL #	Depth	Analyte	Standard	Jul-14	Jul-15	Jul-16	Jul-17	Jul-18	Jul-19	Jul-20	Jul-21	Jul-22	Jul-23
CELL-1-N	33"-54"	Arsenic	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	33"-54"	Chromium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	33"-54"	Lead	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	33"-54"	Nickel	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	33"-54"	Selenium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	33"-54"	Benzene	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	33"-54"	Toluene	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	33"-54"	Xylenes, totals	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	33"-54"	Naphthalene	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	33"-54"	Phenanthrene	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	33"-54"	Beryllium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	33"-54"	Cadmium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	33"-54"	Copper	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	33"-54"	Vanadium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	33"-54"	Zinc	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	33"-54"	Kjeldahl Nitrogen	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	33"-54"	TOC	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	33"-54"	Solids	% wt	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	33"-54"	pH	(stnd units)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	33"-54"	Specific Conductar	(µmho/cm)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	33"-54"	Moisture	(%)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	54"-60"	Arsenic	(mg/g)	3.2	2.8	2.5	2.6	4.2	2.7	4.2	3	2.3	5.3
CELL-1-N	54"-60"	Chromium	(mg/g)	21.2	16	14.3	13.1	23.2	14.7	20.2	18.6	15.3	16
CELL-1-N	54"-60"	Lead	(mg/g)	11.3	10.9	11.6	7.2	18.3	9.4	11.8	11.9	7	11.1
CELL-1-N	54"-60"	Nickel	(mg/g)	16.1	14.5	14.3	10.7	27.4	14.1	22	12.6	8.1	14.7
CELL-1-N	54"-60"	Selenium	(mg/g)	0.12	0.52	<1.1	1.4J	<2.8	2.5 J	<2.6	3.4	<1.6	2.0 J
CELL-1-N	54"-60"	Benzene	(mg/g)	<0.0047	<0.00072	<0.0033	<0.0012	<0.0031	0.00032 J	<0.00063	<0.0031	<0.00026	0.00059
CELL-1-N	54"-60"	Toluene	(mg/g)	<0.0047	<0.0011	<0.0033	<0.0014	<0.0031	0.0092	<0.005	<0.0031	<0.00023	.00029 J
CELL-1-N	54"-60"	Xylenes	(mg/g)	<0.014	<0.003	<0.01	<0.0017	<0.0031	<0.0012	<0.005	<0.0031	<0.0015	<0.0011
CELL-1-N	54"-60"	Naphthalene	(mg/g)	<0.20	<0.029	<0.130	<0.024	<0.024	<0.045	<0.18	<0.024	<0.0061	<0.0053
CELL-1-N	54"-60"	Phenanthrene	(mg/g)	<0.20	<0.042	<0.180	<0.024	<0.024	<0.046	<0.18	<0.024	<0.0016	<0.0014
CELL-1-N	54"-60"	Beryllium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	54"-60"	Cadmium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	54"-60"	Copper	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	54"-60"	Vanadium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	54"-60"	Zinc	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	54"-60"	Kjeldahl Nitrogen	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	54"-60"	TOC	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	54"-60"	Solids	% wt	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	54"-60"	pH	(stnd units)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	54"-60"	Specific Conductar	(µmho/cm)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-N	54"-60"	Moisture	(%)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR

NA - Not Analyzed, NR - Not Required

Table VI.D.1.A - 2
SITE H HISTORICAL SOIL-CORE SOIL ANALYSIS
Alon USA LP - Big Spring Refinery

CELL #	Depth	Analyte	Standard	Jan-95	Jul-95	Jan-96	Jul-96	Jan-97	Jul-97	Jan-98	Jul-98	Jan-99	Jul-04	Jul-05	Jul-06	Jul-07	Jul-08	Jul-09	Jul-10	Jul-11	Jul-12	Jul-13
CELL-1-S	0" - 12"	Arsenic	(mg/g)	8.3	16.4	5	11.7	12	6.2	7.3	11	12.2	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	0" - 12"	Chromium	(mg/g)	158^	208	17.9	154	220	17	250	159	0.4	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	0" - 12"	Lead	(mg/g)	60.6^	131	77.4	88.5	91	10	95	62.9	<5	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	0" - 12"	Nickel	(mg/g)	9.7	15.7	13.9	11	14	3.6	14	11	82.4	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	0" - 12"	Selenium	(mg/g)	3.1	5.8	0.9	4.1	9.8	<0.5	3.4	3	80.2	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	0" - 12"	Benzene	(mg/g)	< 0.2	0.5	< 0.2	< 0.2	< 0.2	<0.2	<0.20	<0.025	34	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	0" - 12"	Toluene	(mg/g)	< 0.2	0.9	< 0.2	< 0.2	< 0.2	<0.2	<0.20	0.088	119	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	0" - 12"	Xylenes, totals	(mg/g)	< 0.2	3.3	< 0.2	< 0.2	< 0.2	<0.2	0.56	0.13	11.6	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	0" - 12"	Naphthalene	(mg/g)	* < 10.0	* < 9	0.7	* 1.9	< 0.3	<0.3	* <1.25	0.21 J	12	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	0" - 12"	Phenanthrene	(mg/g)	* < 10.0	* < 9	4.1	* 47	< 0.3	<0.3	4.8	<13	700	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	0" - 12"	Beryllium	(mg/g)	0.3	0.2	NR	0.2	< 1.0	0.1	0.4	<0.3	11.6	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	0" - 12"	Cadmium	(mg/g)	0.3	0.4	NR	0.2	< 1.0	0.2	0.32	0.17	208	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	0" - 12"	Copper	(mg/g)	12.6	23.7	NR	17.2	24	2.7	16	15.5	0.043	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	0" - 12"	Vanadium	(mg/g)	13.3	21.9	NR	15.9	21	7	20	20.9	0.17	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	0" - 12"	Zinc	(mg/g)	95.1^	108	NR	96.6	180	19	155	81	0.46	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	0" - 12"	Kjeldahl Nitrogen	(mg/g)	1200	NR	NR	NR	1380	NR	780	NA	29	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	0" - 12"	TOC	(mg/g)	43900	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	0" - 12"	Solids	% wt	NR	NR	NR	NR	NR	NR	NR	NR	88	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	0" - 12"	pH	(stnd units)	7.7	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	0" - 12"	Specific Conductar	(µmho/cm)	2740	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	0" - 12"	Moisture	(%)	83	NR	NR	NR	18.5	NR	15.61	NA	6.7	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	12"-33"	Arsenic	(mg/g)	8.5	1.6	1.6	5	2.8	3.7	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	12"-33"	Chromium	(mg/g)	44.5	8.1	2.8	17.9	13	4.9	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	12"-33"	Lead	(mg/g)	18.8	60	7.3	77.4	82	8.3	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	12"-33"	Nickel	(mg/g)	4	1.6	4.4	13.9	7.9	1.8	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	12"-33"	Selenium	(mg/g)	0.7	< 0.5	< 0.5	0.9	< 1.0	<0.5	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	12"-33"	Benzene	(mg/g)	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.2	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	12"-33"	Toluene	(mg/g)	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.2	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	12"-33"	Xylenes, totals	(mg/g)	< 0.2	0.7	< 0.2	< 0.2	< 0.2	0.5	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	12"-33"	Naphthalene	(mg/g)	* < 10.0	* < 0.9	< 0.3	< 0.3	< 0.3	1.2	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	12"-33"	Phenanthrene	(mg/g)	* < 10.0	* < 0.9	3.6	3.6	1.9	4.1	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	12"-33"	Beryllium	(mg/g)	NR	0.2	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	12"-33"	Cadmium	(mg/g)	NR	< 0.1	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	12"-33"	Copper	(mg/g)	NR	4.7	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	12"-33"	Vanadium	(mg/g)	NR	6.5	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	12"-33"	Zinc	(mg/g)	NR	6.4	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	12"-33"	Kjeldahl Nitrogen	(mg/g)	NR	NA	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	12"-33"	TOC	(mg/g)	20900	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	12"-33"	Solids	% wt	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	12"-33"	pH	(stnd units)	8.5	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	12"-33"	Specific Conductar	(µmho/cm)	1670	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	12"-33"	Moisture	(%)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR

NA - Not Analyzed, NR - Not Required

Table VI.D.1.A - 2
SITE H HISTORICAL SOIL-CORE SOIL ANALYSIS
Alon USA LP - Big Spring Refinery

CELL #	Depth	Analyte	Standard	Jul-14	Jul-15	Jul-16	Jul-17	Jul-18	Jul-19	Jul-20	Jul-21	Jul-22	Jul-23
CELL-1-S	0" - 12"	Arsenic	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	0" - 12"	Chromium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	0" - 12"	Lead	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	0" - 12"	Nickel	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	0" - 12"	Selenium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	0" - 12"	Benzene	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	0" - 12"	Toluene	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	0" - 12"	Xylenes, totals	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	0" - 12"	Naphthalene	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	0" - 12"	Phenanthrene	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	0" - 12"	Beryllium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	0" - 12"	Cadmium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	0" - 12"	Copper	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	0" - 12"	Vanadium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	0" - 12"	Zinc	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	0" - 12"	Kjeldahl Nitrogen	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	0" - 12"	TOC	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	0" - 12"	Solids	% wt	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	0" - 12"	pH	(stnd units)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	0" - 12"	Specific Conductar	(µmho/cm)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	0" - 12"	Moisture	(%)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	12"-33"	Arsenic	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	12"-33"	Chromium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	12"-33"	Lead	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	12"-33"	Nickel	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	12"-33"	Selenium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	12"-33"	Benzene	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	12"-33"	Toluene	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	12"-33"	Xylenes, totals	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	12"-33"	Naphthalene	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	12"-33"	Phenanthrene	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	12"-33"	Beryllium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	12"-33"	Cadmium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	12"-33"	Copper	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	12"-33"	Vanadium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	12"-33"	Zinc	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	12"-33"	Kjeldahl Nitrogen	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	12"-33"	TOC	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	12"-33"	Solids	% wt	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	12"-33"	pH	(stnd units)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	12"-33"	Specific Conductar	(µmho/cm)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	12"-33"	Moisture	(%)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR

NA - Not Analyzed, NR - Not Required

Table VI.D.1.A - 2
SITE H HISTORICAL SOIL-CORE SOIL ANALYSIS
Alon USA LP - Big Spring Refinery

CELL #	Depth	Analyte	Standard	Jan-95	Jul-95	Jan-96	Jul-96	Jan-97	Jul-97	Jan-98	Jul-98	Jan-99	Jul-04	Jul-05	Jul-06	Jul-07	Jul-08	Jul-09	Jul-10	Jul-11	Jul-12	Jul-13
CELL-1-S	33"-54"	Arsenic	(mg/g)	4.5	1.1	1.1	1.6	1.9	3.6	2.8	2	12	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	33"-54"	Chromium	(mg/g)	0.3	2	5.9	2.8	11	23.9	12	50	NA	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	33"-54"	Lead	(mg/g)	25.7	3.5	5.5	7.3	6.4	74.1	45	40.7	NA	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	33"-54"	Nickel	(mg/g)	21.6	1.2	3.2	4.4	11	6.4	6.2	7.3	264	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	33"-54"	Selenium	(mg/g)	< 0.5	< 0.5	< 0.5	< 0.5	< 1.0	<0.5	<0.50	<1	NA	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	33"-54"	Benzene	(mg/g)	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.2	<0.20	<0.005	16.3	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	33"-54"	Toluene	(mg/g)	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.2	<0.20	0.007	116	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	33"-54"	Xylenes, totals	(mg/g)	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.2	0.34	0.005	3.8	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	33"-54"	Naphthalene	(mg/g)	* < 4.0	< 0.3	< 0.3	< 0.3	< 0.3	<0.3	<0.30	<6.6	13	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	33"-54"	Phenanthrene	(mg/g)	15	< 0.3	< 0.3	< 0.3	< 0.3	<0.3	<0.30	8.5	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	33"-54"	Beryllium	(mg/g)	NR	0.3	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	33"-54"	Cadmium	(mg/g)	NR	< 0.1	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	33"-54"	Copper	(mg/g)	NR	2.7	NR	NR	NR	NR	NR	NR	<0.005	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	33"-54"	Vanadium	(mg/g)	NR	6.5	NR	NR	NR	NR	NR	NR	<0.005	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	33"-54"	Zinc	(mg/g)	NR	2.6	NR	NR	NR	NR	NR	NR	<0.005	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	33"-54"	Kjeldahl Nitrogen	(mg/g)	NR	NA	NR	NR	NR	NR	NR	NR	<13	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	33"-54"	TOC	(mg/g)	17000	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	33"-54"	Solids	% wt	NR	NR	NR	NR	NR	NR	NR	NR	87	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	33"-54"	pH	(stnd units)	8.1	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	33"-54"	Specific Conductar	(µmho/cm)	2220	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	33"-54"	Moisture	(%)	NR	NR	NR	NR	NR	NR	NR	NR	<13	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	54"-60"	Arsenic	(mg/g)	2.6	1.2	16.4	1.1	1.9	2.8	< 0.50	2	3.4	2.77	1.68	2.34	<10	3.01	3.57	3.45	1.9	4.3	2.2
CELL-1-S	54"-60"	Chromium	(mg/g)	8.8	1.4	431	5.9	9.1	19	7.2	9	NA	28.8	7.96	11.9	10.7	12.7	10.3	16.2	15.9	26.5	12.6
CELL-1-S	54"-60"	Lead	(mg/g)	6.8	2.7	246	5.5	5.4	3.3	3.4	12.5	NA	14.2	4.86	9.25	9.61	8.39	7.93	10.4	8.7	23.7	5.8
CELL-1-S	54"-60"	Nickel	(mg/g)	9.5	0.9	17.4	3.2	9.5	20	7.7	7.2	23.3	9.72	7.64	15.3	12.3	13.8	12.8	12.2	13.8	23.7	9.7
CELL-1-S	54"-60"	Selenium	(mg/g)	< 0.5	< 0.5	9.5	< 0.5	< 1.0	<0.5	<0.50	<1	NA	<0.5	<0.5	<0.5	<10	<0.5	2.25	0.53	<0.16	<0.95	0.44
CELL-1-S	54"-60"	Benzene	(mg/g)	< 0.2	< 0.2	< 0.2	1.1	< 0.2	<0.2	<0.20	<0.005	18.4	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.005	<0.0039	<0.005	<0.0042
CELL-1-S	54"-60"	Toluene	(mg/g)	< 0.2	< 0.2	< 0.2	5.9	< 0.2	<0.2	<0.20	<0.005	11.4	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.005	<0.0039	<0.005	0.0191
CELL-1-S	54"-60"	Xylenes	(mg/g)	< 0.2	< 0.2	< 0.2	5.5	< 0.2	<0.2	<0.20	<0.005	<0.001	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.005	<0.012	<0.015	0.0163
CELL-1-S	54"-60"	Naphthalene	(mg/g)	* < 4.0	< 0.3	* 0.7	3.2	< 0.3	<0.3	<0.30	<3.3	12	<0.3	<0.3	<0.3	<0.33	<0.3	<0.17	<0.17	<0.19	0.818	2.22
CELL-1-S	54"-60"	Phenanthrene	(mg/g)	* < 4.0	< 0.3	* 12	< 0.5	< 0.3	<0.3	<0.30	2.4 J	NR	<0.3	<0.3	<0.3	<0.33	<0.3	<0.17	<0.17	<0.19	3.3	7.49
CELL-1-S	54"-60"	Beryllium	(mg/g)	NR	0.2	0.2	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	54"-60"	Cadmium	(mg/g)	NR	< 0.1	0.2	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	54"-60"	Copper	(mg/g)	NR	2.4	29.8	NR	NR	NR	NR	NR	<0.005	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	54"-60"	Vanadium	(mg/g)	NR	5.3	22.3	NR	NR	NR	NR	NR	<0.005	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	54"-60"	Zinc	(mg/g)	NR	2.2	248	NR	NR	NR	NR	NR	<0.005	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	54"-60"	Kjeldahl Nitrogen	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	<0.33	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	54"-60"	TOC	(mg/g)	1400	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	54"-60"	Solids	% wt	NR	NR	NR	NR	NR	NR	NR	NR	88	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	54"-60"	pH	(stnd units)	7.8	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	54"-60"	Specific Conductar	(µmho/cm)	1110	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	54"-60"	Moisture	(%)	NR	NR	NR	NR	NR	NR	NR	NR	<0.33	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR

NA - Not Analyzed, NR - Not Required

Table VI.D.1.A - 2
SITE H HISTORICAL SOIL-CORE SOIL ANALYSIS
Alon USA LP - Big Spring Refinery

CELL #	Depth	Analyte	Standard	Jul-14	Jul-15	Jul-16	Jul-17	Jul-18	Jul-19	Jul-20	Jul-21	Jul-22	Jul-23
CELL-1-S	33"-54"	Arsenic	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	33"-54"	Chromium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	33"-54"	Lead	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	33"-54"	Nickel	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	33"-54"	Selenium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	33"-54"	Benzene	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	33"-54"	Toluene	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	33"-54"	Xylenes, totals	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	33"-54"	Naphthalene	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	33"-54"	Phenanthrene	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	33"-54"	Beryllium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	33"-54"	Cadmium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	33"-54"	Copper	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	33"-54"	Vanadium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	33"-54"	Zinc	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	33"-54"	Kjeldahl Nitrogen	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	33"-54"	TOC	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	33"-54"	Solids	% wt	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	33"-54"	pH	(stnd units)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	33"-54"	Specific Conductar	(µmho/cm)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	33"-54"	Moisture	(%)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	54"-60"	Arsenic	(mg/g)	3	3.6	6.9	11.7	3.6	4.7	2.9	4.4	3.2	2.1
CELL-1-S	54"-60"	Chromium	(mg/g)	21.2	22.1	21.6	17.9	16.2	33.3	15.1	14.7	18.8	9.3
CELL-1-S	54"-60"	Lead	(mg/g)	12.2	12.9	84.1	16	10.3	11.2	10.9	9.8	72.8	6.4
CELL-1-S	54"-60"	Nickel	(mg/g)	18.3	23.5	12.1	17.6	16.7	21.1	15.1	11.5	16	8.5
CELL-1-S	54"-60"	Selenium	(mg/g)	0.14	0.44	<1.1	2.0J	<2.9	3.1	<2.8	3.4	2.4	1.3
CELL-1-S	54"-60"	Benzene	(mg/g)	<0.0044	<0.00076	<0.001	<0.0012	<0.0013	<0.00048	0.00075J	<0.0031	<0.00021	0.00023
CELL-1-S	54"-60"	Toluene	(mg/g)	<0.0044	<0.0011	0.0063	<0.0014	<0.0013	0.0238	0.0174	<0.0031	<0.00019	0.0024
CELL-1-S	54"-60"	Xylenes	(mg/g)	<0.013	<0.0031	0.0103	<0.0016	<0.0013	0.0581	0.0413	<0.0031	<0.0012	0.0064
CELL-1-S	54"-60"	Naphthalene	(mg/g)	<0.19	<0.031	<0.028	<0.024	<0.026	0.155 J	1.13	<0.024	0.0101	0.0064
CELL-1-S	54"-60"	Phenanthrene	(mg/g)	<0.19	<0.044	<0.039	0.0304J	<0.026	3.29	4.75	<0.024	0.285	<0.0014
CELL-1-S	54"-60"	Beryllium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	54"-60"	Cadmium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	54"-60"	Copper	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	54"-60"	Vanadium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	54"-60"	Zinc	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	54"-60"	Kjeldahl Nitrogen	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	54"-60"	TOC	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	54"-60"	Solids	% wt	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	54"-60"	pH	(stnd units)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	54"-60"	Specific Conductar	(µmho/cm)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-1-S	54"-60"	Moisture	(%)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR

NA - Not Analyzed, NR - Not Required

Table VI.D.1.A - 2
SITE H HISTORICAL SOIL-CORE SOIL ANALYSIS
Alon USA LP - Big Spring Refinery

CELL #	Depth	Analyte	Standard	Jan-95	Jul-95	Jan-96	Jul-96	Jan-97	Jul-97	Jan-98	Jul-98	Jan-99	Jul-04	Jul-05	Jul-06	Jul-07	Jul-08	Jul-09	Jul-10	Jul-11	Jul-12	Jul-13
CELL-2-N	0" - 12"	Arsenic	(mg/g)	15.4	15.4	12.6	16.4	10	14	6.1	9	5.8	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	0" - 12"	Chromium	(mg/g)	468	468	330	431	300	380	230	40	<0.3	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	0" - 12"	Lead	(mg/g)	112	112	114	246	65	190	45	20.6	<0.3	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	0" - 12"	Nickel	(mg/g)	15.9	15.9	17.8	17.4	12	20	11	18	14.9	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	0" - 12"	Selenium	(mg/g)	9.4	9.4	6.7	9.5	4	7.8	2.7	<1	2.3	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	0" - 12"	Benzene	(mg/g)	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.2	<0.20	0.037	5.4	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	0" - 12"	Toluene	(mg/g)	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.2	<0.20	0.055	10.3	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	0" - 12"	Xylenes, totals	(mg/g)	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.2	<0.20	0.086	<0.5	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	0" - 12"	Naphthalene	(mg/g)	* < 4.0	* < 4.0	1	* 0.7	< 0.3	<0.3	* <0.60	7.6 J	7	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	0" - 12"	Phenanthrene	(mg/g)	* < 4.0	* < 4.0	1.9	* 12	< 0.3	<0.3	* <0.60	49	400	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	0" - 12"	Beryllium	(mg/g)	0.3	0.3	NA	0.2	< 1.0	0.2	0.36	0.3	8.4	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	0" - 12"	Cadmium	(mg/g)	0.4	0.4	NA	0.2	< 1.0	0.7	0.18	0.3	14	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	0" - 12"	Copper	(mg/g)	27.7	27.7	NA	29.8	18	26	12	35	<0.005	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	0" - 12"	Vanadium	(mg/g)	20.9	20.9	NA	22.3	18	31	17	16.5	<0.005	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	0" - 12"	Zinc	(mg/g)	257	257	NA	248	190	200	120	59	0.007	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	0" - 12"	Kjeldahl Nitrogen	(mg/g)	710	710	NA	NA	621	NA	430	NA	<2.6	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	0" - 12"	TOC	(mg/g)	17400	17400	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	0" - 12"	Solids	% wt	NR	NR	NR	NR	NR	NR	NR	NR	93	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	0" - 12"	pH	(stnd units)	7.7	7.7	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	0" - 12"	Specific Conductar	(µmho/cm)	3440	3440	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	0" - 12"	Moisture	(%)	89	89	NR	NR	12.1	NR	14.12	NA	<2.6	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	12"-33"	Arsenic	(mg/g)	2.3	12.3	4.1	12.6	1.9	8.9	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	12"-33"	Chromium	(mg/g)	4.5	439	20.5	330	5.7	23.9	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	12"-33"	Lead	(mg/g)	4.3	125	23	114	5.5	20.6	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	12"-33"	Nickel	(mg/g)	3.9	14.3	8.3	17.8	6	19.9	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	12"-33"	Selenium	(mg/g)	< 0.5	10.1	0.7	6.7	< 1.0	<0.5	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	12"-33"	Benzene	(mg/g)	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.2	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	12"-33"	Toluene	(mg/g)	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.2	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	12"-33"	Xylenes, totals	(mg/g)	< 0.2	< 0.2	0.3	< 0.2	< 0.2	<0.2	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	12"-33"	Naphthalene	(mg/g)	* < 4.0	* < 40	* 1.2	1	< 0.3	6.7	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	12"-33"	Phenanthrene	(mg/g)	* < 4.0	* < 40	* 3.7	1.9	< 0.3	22	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	12"-33"	Beryllium	(mg/g)	NR	0.3	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	12"-33"	Cadmium	(mg/g)	NR	0.4	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	12"-33"	Copper	(mg/g)	NR	27	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	12"-33"	Vanadium	(mg/g)	NR	17.5	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	12"-33"	Zinc	(mg/g)	NR	217	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	12"-33"	Kjeldahl Nitrogen	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	12"-33"	TOC	(mg/g)	730	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	12"-33"	Solids	% wt	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	12"-33"	pH	(stnd units)	7.7	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	12"-33"	Specific Conductar	(µmho/cm)	2110	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	12"-33"	Moisture	(%)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR

NA - Not Analyzed, NR - Not Required

Table VI.D.1.A - 2
SITE H HISTORICAL SOIL-CORE SOIL ANALYSIS
Alon USA LP - Big Spring Refinery

CELL #	Depth	Analyte	Standard	Jul-14	Jul-15	Jul-16	Jul-17	Jul-18	Jul-19	Jul-20	Jul-21	Jul-22	Jul-23
CELL-2-N	0" - 12"	Arsenic	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	0" - 12"	Chromium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	0" - 12"	Lead	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	0" - 12"	Nickel	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	0" - 12"	Selenium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	0" - 12"	Benzene	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	0" - 12"	Toluene	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	0" - 12"	Xylenes, totals	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	0" - 12"	Naphthalene	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	0" - 12"	Phenanthrene	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	0" - 12"	Beryllium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	0" - 12"	Cadmium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	0" - 12"	Copper	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	0" - 12"	Vanadium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	0" - 12"	Zinc	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	0" - 12"	Kjeldahl Nitrogen	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	0" - 12"	TOC	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	0" - 12"	Solids	% wt	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	0" - 12"	pH	(stnd units)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	0" - 12"	Specific Conductar	(µmho/cm)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	0" - 12"	Moisture	(%)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	12"-33"	Arsenic	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	12"-33"	Chromium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	12"-33"	Lead	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	12"-33"	Nickel	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	12"-33"	Selenium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	12"-33"	Benzene	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	12"-33"	Toluene	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	12"-33"	Xylenes, totals	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	12"-33"	Naphthalene	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	12"-33"	Phenanthrene	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	12"-33"	Beryllium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	12"-33"	Cadmium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	12"-33"	Copper	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	12"-33"	Vanadium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	12"-33"	Zinc	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	12"-33"	Kjeldahl Nitrogen	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	12"-33"	TOC	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	12"-33"	Solids	% wt	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	12"-33"	pH	(stnd units)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	12"-33"	Specific Conductar	(µmho/cm)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	12"-33"	Moisture	(%)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR

NA - Not Analyzed, NR - Not Required

Table VI.D.1.A - 2
SITE H HISTORICAL SOIL-CORE SOIL ANALYSIS
Alon USA LP - Big Spring Refinery

CELL #	Depth	Analyte	Standard	Jan-95	Jul-95	Jan-96	Jul-96	Jan-97	Jul-97	Jan-98	Jul-98	Jan-99	Jul-04	Jul-05	Jul-06	Jul-07	Jul-08	Jul-09	Jul-10	Jul-11	Jul-12	Jul-13
CELL-2-N	33"-54"	Arsenic	(mg/g)	2.2	5.3	3.5	4.1	1.7	3	0.51	2	2.3	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	33"-54"	Chromium	(mg/g)	4.4	19.2	29.1	20.5	8.6	14.5	11	6	NA	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	33"-54"	Lead	(mg/g)	4.7	13.1	4.7(3)	23	6	0.5	6.2	6.9	NA	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	33"-54"	Nickel	(mg/g)	3.3	2.8	8.1	8.3	11	13.7	15	11	16.8	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	33"-54"	Selenium	(mg/g)	< 0.5	< 0.5	< 0.5	0.7	< 1.0	<0.5	< 0.50	<1	NA	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	33"-54"	Benzene	(mg/g)	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.2	<0.20	<0.005	10.8	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	33"-54"	Toluene	(mg/g)	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.2	<0.20	<0.005	10.6	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	33"-54"	Xylenes, totals	(mg/g)	< 0.2	0.3	< 0.2	0.3	< 0.2	<0.2	<0.20	<0.005	<0.5	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	33"-54"	Naphthalene	(mg/g)	< 0.3	* < 40	< 0.3(3)	* 1.2	< 0.3	<0.3	<0.30	<0.33	11	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	33"-54"	Phenanthrene	(mg/g)	< 0.3	* < 40	< 0.3(3)	* 3.7	< 0.3	<0.3	<0.30	<0.33	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	33"-54"	Beryllium	(mg/g)	NR	0.2	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	33"-54"	Cadmium	(mg/g)	NR	< 0.1	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	33"-54"	Copper	(mg/g)	NR	2.7	NR	NR	NR	NR	NR	NR	<0.005	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	33"-54"	Vanadium	(mg/g)	NR	5.7	NR	NR	NR	NR	NR	NR	<0.005	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	33"-54"	Zinc	(mg/g)	NR	13.6	NR	NR	NR	NR	NR	NR	<0.005	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	33"-54"	Kjeldahl Nitrogen	(mg/g)	NR	NA	NR	NR	NR	NR	NR	NR	<0.33	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	33"-54"	TOC	(mg/g)	540	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	33"-54"	Solids	% wt	NR	NR	NR	NR	NR	NR	NR	NR	89	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	33"-54"	pH	(stnd units)	7.7	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	33"-54"	Specific Conductar	(µmho/cm)	1440	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	33"-54"	Moisture	(%)	NR	NR	NR	NR	NR	NR	NR	NR	<0.33	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	54"-60"	Arsenic	(mg/g)	2.5	1.7	13.9	3.5	2	2.4	< 0.50	2	2.2	3.38	1.92	4.32	<10	2.97	3.04	2.05	2	2.6	3.3
CELL-2-N	54"-60"	Chromium	(mg/g)	5.8	4.4	489	29.1	12	20.3	18	9	NR	21.7	10.8	18.2	10.3	14.5	10.1	7.46	15.1	20.7	20.1
CELL-2-N	54"-60"	Lead	(mg/g)	5.4	4.8	188	4.7(3)	13	4.4	8.5	8.3	NR	60.3	7.27	14.7	9.97	9.14	7.65	8.23	7.7	18.2	19.7
CELL-2-N	54"-60"	Nickel	(mg/g)	5.5	5.6	17	8.1	7.1	13.8	17	11	14.7	11.3	11.1	22.8	11.7	16.1	11.7	7.21	14.2	13.9	16.1
CELL-2-N	54"-60"	Selenium	(mg/g)	< 0.5	< 0.5	5.1	< 0.5	< 1.0	<0.5	< 0.50	<1	NA	<0.5	<0.5	<0.5	<10	<0.5	1.90	<0.5	<0.19	<0.32	0.36
CELL-2-N	54"-60"	Benzene	(mg/g)	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.2	<0.20	<0.005	10.8	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.005	<0.0043	<0.0048	<0.0042
CELL-2-N	54"-60"	Toluene	(mg/g)	< 0.2	0.3	< 0.2	< 0.2	< 0.2	<0.2	<0.20	<0.005	7	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.005	<0.0043	<0.0048	<0.0042
CELL-2-N	54"-60"	Xylenes	(mg/g)	< 0.2	2	< 0.2	< 0.2	< 0.2	<0.2	<0.20	<0.005	<0.5	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.005	<0.013	<0.014	<0.013
CELL-2-N	54"-60"	Naphthalene	(mg/g)	< 0.3	* < 90	< 0.3	< 0.3(3)	< 0.3	<0.3	<0.30	<0.33	11	<0.3	<0.3	<0.3	<0.33	<0.3	<0.17	<0.17	<0.19	<0.2	<0.19
CELL-2-N	54"-60"	Phenanthrene	(mg/g)	< 0.3	* < 90	1.7	< 0.3(3)	< 0.3	<0.3	<0.30	<0.33	NR	<0.3	<0.3	<0.3	<0.33	<0.3	<0.17	<0.17	<0.19	<0.2	<0.19
CELL-2-N	54"-60"	Beryllium	(mg/g)	NR	0.3	0.3	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	54"-60"	Cadmium	(mg/g)	NR	0.1	0.3	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	54"-60"	Copper	(mg/g)	NR	5.5	29.5	NR	NR	NR	NR	NR	<0.005	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	54"-60"	Vanadium	(mg/g)	NR	6.3	21.3	NR	NR	NR	NR	NR	<0.005	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	54"-60"	Zinc	(mg/g)	NR	14.8	269	NR	NR	NR	NR	NR	<0.005	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	54"-60"	Kjeldahl Nitrogen	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	<0.33	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	54"-60"	TOC	(mg/g)	750	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	54"-60"	Solids	% wt	NR	NR	NR	NR	NR	NR	NR	NR	89	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	54"-60"	pH	(stnd units)	7.8	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	54"-60"	Specific Conductar	(µmho/cm)	1330	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	54"-60"	Moisture	(%)	NR	NR	NR	NR	NR	NR	NR	NR	<0.33	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR

NA - Not Analyzed, NR - Not Required

Table VI.D.1.A - 2
SITE H HISTORICAL SOIL-CORE SOIL ANALYSIS
Alon USA LP - Big Spring Refinery

CELL #	Depth	Analyte	Standard	Jul-14	Jul-15	Jul-16	Jul-17	Jul-18	Jul-19	Jul-20	Jul-21	Jul-22	Jul-23
CELL-2-N	33"-54"	Arsenic	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	33"-54"	Chromium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	33"-54"	Lead	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	33"-54"	Nickel	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	33"-54"	Selenium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	33"-54"	Benzene	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	33"-54"	Toluene	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	33"-54"	Xylenes, totals	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	33"-54"	Naphthalene	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	33"-54"	Phenanthrene	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	33"-54"	Beryllium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	33"-54"	Cadmium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	33"-54"	Copper	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	33"-54"	Vanadium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	33"-54"	Zinc	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	33"-54"	Kjeldahl Nitrogen	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	33"-54"	TOC	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	33"-54"	Solids	% wt	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	33"-54"	pH	(stnd units)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	33"-54"	Specific Conductar	(µmho/cm)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	33"-54"	Moisture	(%)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	54"-60"	Arsenic	(mg/g)	3.8	3.1	<2.2	2.8	3.1	2.6	4.2	3.7	2.3	3.40
CELL-2-N	54"-60"	Chromium	(mg/g)	30.3	18.4	7.1	19	19.6	20.6	21	23	20.3	17.10
CELL-2-N	54"-60"	Lead	(mg/g)	21.4	9.9	5.9	11.7	13.5	13	13	20.3	123	11.00
CELL-2-N	54"-60"	Nickel	(mg/g)	17.5	18	4.3	13.5	19.1	11.4	21.5	16.9	12.3	20.70
CELL-2-N	54"-60"	Selenium	(mg/g)	0.21	0.4	<1.1	1.0J	<2.9	2.5 J	<2.6	4.4	1.7	2.80
CELL-2-N	54"-60"	Benzene	(mg/g)	<0.0041	<0.00083	<0.0034	<0.0013	<0.0011	<0.00034	<0.0005	<0.0031	<0.00020	0.001
CELL-2-N	54"-60"	Toluene	(mg/g)	<0.0041	<0.0013	<0.0034	<0.0015	<0.0011	0.0024 J	<0.004	<0.0031	<0.00018	0.00067
CELL-2-N	54"-60"	Xylenes	(mg/g)	<0.012	<0.0035	<0.01	<0.0017	<0.0011	<0.0013	<0.004	<0.0031	<0.0011	<0.00099
CELL-2-N	54"-60"	Naphthalene	(mg/g)	<0.18	<0.034	<0.140	<0.024	<0.025	<0.045	<0.19	<0.024	<0.0051	<0.0052
CELL-2-N	54"-60"	Phenanthrene	(mg/g)	<0.18	<0.049	1.77	<0.024	<0.025	<0.043	<0.19	<0.024	<0.0013	<0.0013
CELL-2-N	54"-60"	Beryllium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	54"-60"	Cadmium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	54"-60"	Copper	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	54"-60"	Vanadium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	54"-60"	Zinc	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	54"-60"	Kjeldahl Nitrogen	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	54"-60"	TOC	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	54"-60"	Solids	% wt	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	54"-60"	pH	(stnd units)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	54"-60"	Specific Conductar	(µmho/cm)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-N	54"-60"	Moisture	(%)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR

NA - Not Analyzed, NR - Not Required

Table VI.D.1.A - 2
SITE H HISTORICAL SOIL-CORE SOIL ANALYSIS
Alon USA LP - Big Spring Refinery

CELL #	Depth	Analyte	Standard	Jan-95	Jul-95	Jan-96	Jul-96	Jan-97	Jul-97	Jan-98	Jul-98	Jan-99	Jul-04	Jul-05	Jul-06	Jul-07	Jul-08	Jul-09	Jul-10	Jul-11	Jul-12	Jul-13
CELL-2-S	0" - 12"	Arsenic	(mg/g)	10.2	1.5	13	13.9	12	14	3.2	7	9.3	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	0" - 12"	Chromium	(mg/g)	301^	6.4	420	489	480	620	20	135	0.3	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	0" - 12"	Lead	(mg/g)	87.1^	5.3	162	188	200	250	19	42.1	<0.3	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	0" - 12"	Nickel	(mg/g)	10.4	5.1	15.4	17	16	19	14	10	47.2	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	0" - 12"	Selenium	(mg/g)	3	< 0.5	4.6	5.1	4.4	5.5	< 0.50	1	16.6	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	0" - 12"	Benzene	(mg/g)	< 0.2	< 0.2	< 0.2	< 0.2	0.2	<0.2	<0.20	0.1	12.5	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	0" - 12"	Toluene	(mg/g)	< 0.2	< 0.2	< 0.2	< 0.2	0.9	<0.2	<0.20	0.26	28.1	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	0" - 12"	Xylenes, totals	(mg/g)	< 0.2	< 0.2	< 0.2	< 0.2	2.7	<0.2	<0.20	0.62	<0.5	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	0" - 12"	Naphthalene	(mg/g)	* < 10.0	< 0.3	* 0.3	< 0.3	8.8	<0.3	* <5	8.3 J	14	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	0" - 12"	Phenanthrene	(mg/g)	* < 10.0	< 0.3	* 1.4	1.7	16	<0.3	* <5	16 J	800	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	0" - 12"	Beryllium	(mg/g)	0.3	0.3	NR	0.3	< 1.0	0.2	0.49	<0.3	16.5	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	0" - 12"	Cadmium	(mg/g)	0.4	< 0.1	NR	0.3	< 1.0	0.9	0.3	0.14	55	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	0" - 12"	Copper	(mg/g)	17^	4	NR	29.5	31	33	14	12.4	0.31	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	0" - 12"	Vanadium	(mg/g)	16	6.3	NR	21.3	21	30	15	12.8	0.96	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	0" - 12"	Zinc	(mg/g)	166^	8.4	NR	269	260	310	65	72	26	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	0" - 12"	Kjeldahl Nitrogen	(mg/g)	770	NA	NR	NA	713	NA	380		13	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	0" - 12"	TOC	(mg/g)	42900	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	0" - 12"	Solids	% wt	NR	NR	NR	NR	NR	NR	NR	NR	86	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	0" - 12"	pH	(stnd units)	8.2	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	0" - 12"	Specific Conductar	(µmho/cm)	1780	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	0" - 12"	Moisture	(%)	86	NR	NR	NR	NR	NR	17.65		<13	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	12"-33"	Arsenic	(mg/g)	8	9.2	1	13	* 9.6	12.3	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	12"-33"	Chromium	(mg/g)	14.5	224	2.8	420	* 26	380	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	12"-33"	Lead	(mg/g)	18.2	78.8	3.6	162	* 27	130	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	12"-33"	Nickel	(mg/g)	6.7	13.7	3.2	15.4	* 26	15.9	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	12"-33"	Selenium	(mg/g)	< 0.5	2.3	< 0.5	4.6	< 1.0	<0.5	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	12"-33"	Benzene	(mg/g)	< 0.2	0.2	< 0.2	< 0.2	< 0.2	<0.2	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	12"-33"	Toluene	(mg/g)	< 0.2	2	< 0.2	< 0.2	< 0.2	0.3	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	12"-33"	Xylenes, totals	(mg/g)	< 0.2	13.2	< 0.2	< 0.2	< 0.2	0.9	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	12"-33"	Naphthalene	(mg/g)	< 0.3	* < 4	< 0.3	* 0.3	3.5	12	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	12"-33"	Phenanthrene	(mg/g)	< 0.3	* < 4	< 0.3	* 1.4	5.2	25	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	12"-33"	Beryllium	(mg/g)	NR	0.2	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	12"-33"	Cadmium	(mg/g)	NR	0.3	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	12"-33"	Copper	(mg/g)	NR	20.1	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	12"-33"	Vanadium	(mg/g)	NR	11.6	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	12"-33"	Zinc	(mg/g)	NR	134	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	12"-33"	Kjeldahl Nitrogen	(mg/g)	NR	NA	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	12"-33"	TOC	(mg/g)	42700	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	12"-33"	Solids	% wt	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	12"-33"	pH	(stnd units)	7.2	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	12"-33"	Specific Conductar	(µmho/cm)	3670	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	12"-33"	Moisture	(%)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR

NA - Not Analyzed, NR - Not Required

Table VI.D.1.A - 2
SITE H HISTORICAL SOIL-CORE SOIL ANALYSIS
Alon USA LP - Big Spring Refinery

CELL #	Depth	Analyte	Standard	Jul-14	Jul-15	Jul-16	Jul-17	Jul-18	Jul-19	Jul-20	Jul-21	Jul-22	Jul-23
CELL-2-S	0" - 12"	Arsenic	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	0" - 12"	Chromium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	0" - 12"	Lead	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	0" - 12"	Nickel	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	0" - 12"	Selenium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	0" - 12"	Benzene	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	0" - 12"	Toluene	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	0" - 12"	Xylenes, totals	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	0" - 12"	Naphthalene	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	0" - 12"	Phenanthrene	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	0" - 12"	Beryllium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	0" - 12"	Cadmium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	0" - 12"	Copper	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	0" - 12"	Vanadium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	0" - 12"	Zinc	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	0" - 12"	Kjeldahl Nitrogen	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	0" - 12"	TOC	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	0" - 12"	Solids	% wt	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	0" - 12"	pH	(stnd units)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	0" - 12"	Specific Conductar	(µmho/cm)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	0" - 12"	Moisture	(%)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	12"-33"	Arsenic	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	12"-33"	Chromium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	12"-33"	Lead	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	12"-33"	Nickel	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	12"-33"	Selenium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	12"-33"	Benzene	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	12"-33"	Toluene	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	12"-33"	Xylenes, totals	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	12"-33"	Naphthalene	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	12"-33"	Phenanthrene	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	12"-33"	Beryllium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	12"-33"	Cadmium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	12"-33"	Copper	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	12"-33"	Vanadium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	12"-33"	Zinc	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	12"-33"	Kjeldahl Nitrogen	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	12"-33"	TOC	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	12"-33"	Solids	% wt	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	12"-33"	pH	(stnd units)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	12"-33"	Specific Conductar	(µmho/cm)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	12"-33"	Moisture	(%)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR

NA - Not Analyzed, NR - Not Required

Table VI.D.1.A - 2
SITE H HISTORICAL SOIL-CORE SOIL ANALYSIS
Alon USA LP - Big Spring Refinery

CELL #	Depth	Analyte	Standard	Jan-95	Jul-95	Jan-96	Jul-96	Jan-97	Jul-97	Jan-98	Jul-98	Jan-99	Jul-04	Jul-05	Jul-06	Jul-07	Jul-08	Jul-09	Jul-10	Jul-11	Jul-12	Jul-13
CELL-2-S	33"-54"	Arsenic	(mg/g)	2.4	9.9	1.3	1	1.7	2.7	< 0.50	2	3	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	33"-54"	Chromium	(mg/g)	4.9	32.1	6.1	2.8	12	15.3	16	10	NA	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	33"-54"	Lead	(mg/g)	5.2	32.4	4.7	3.6	6.2	2	6.9	7.1	NA	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	33"-54"	Nickel	(mg/g)	5.9	16.1	4.1	3.2	12	16.4	20	11	26	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	33"-54"	Selenium	(mg/g)	< 0.5	< 0.5	< 0.5	< 0.5	< 1.0	<0.5	< 0.50	<1	NA	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	33"-54"	Benzene	(mg/g)	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.2	<0.20	<0.005	20.1	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	33"-54"	Toluene	(mg/g)	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.2	<0.20	<0.005	13	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	33"-54"	Xylenes, totals	(mg/g)	< 0.2	1	< 0.2	< 0.2	< 0.2	<0.2	<0.20	<0.005	<0.001	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	33"-54"	Naphthalene	(mg/g)	< 0.3	* < 2	< 0.3	< 0.3	< 0.3	<0.3	<0.30	<0.33	13	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	33"-54"	Phenanthrene	(mg/g)	< 0.3	5.5	< 0.3	< 0.3	< 0.3	<0.3	<0.30	<0.33	NA	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	33"-54"	Beryllium	(mg/g)	NR	0.4	NR	NR	NR	NR	NR	NR	NA	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	33"-54"	Cadmium	(mg/g)	NR	0.4	NR	NR	NR	NR	NR	NR	NA	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	33"-54"	Copper	(mg/g)	NR	39	NR	NR	NR	NR	NR	NR	<0.005	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	33"-54"	Vanadium	(mg/g)	NR	11.5	NR	NR	NR	NR	NR	NR	<0.005	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	33"-54"	Zinc	(mg/g)	NR	48.6	NR	NR	NR	NR	NR	NR	<0.005	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	33"-54"	Kjeldahl Nitrogen	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	<0.33	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	33"-54"	TOC	(mg/g)	720	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	33"-54"	Solids	% wt	NR	NR	NR	NR	NR	NR	NR	NR	87	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	33"-54"	pH	(stnd units)	7.8	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	33"-54"	Specific Conductar	(µmho/cm)	1560	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	33"-54"	Moisture	(%)	NR	NR	NR	NR	NR	NR	NR	NR	<0.33	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	54"-60"	Arsenic	(mg/g)	2.4	1.5	13.5	1.3	1.8	3.4	< 0.50	2	2	3.27	2.51	1.95	<10	2.34	2.44	2.08	2.4	3.1	4.2
CELL-2-S	54"-60"	Chromium	(mg/g)	6.4	5	166	6.1	13	24.2	9	24	NA	15.8	10.5	15.9	6.36	10.8	8.94	9.39	17.3	27.1	21.9
CELL-2-S	54"-60"	Lead	(mg/g)	6.4	4	122(3)	4.7	7.3	4.6	4.8	9.1	NA	9.7	7.26	8.64	<5	7.15	6.33	5.85	12.4	13	11
CELL-2-S	54"-60"	Nickel	(mg/g)	4.8	5.6	16	4.1	5.6	22.6	9.6	8	16.6	14.1	11.1	8.66	7.06	12.9	10.1	8.65	17.7	19.3	19.8
CELL-2-S	54"-60"	Selenium	(mg/g)	< 0.5	< 0.5	7.3	< 0.5	< 1.0	<0.5	< 0.50	<1	NA	<0.5	<0.5	<0.5	<10	<0.5	1.45	<0.5	<0.16	<0.19	0.44
CELL-2-S	54"-60"	Benzene	(mg/g)	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.2	<0.20	<0.005	9.9	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.005	<0.0043	<0.0043	<0.0043
CELL-2-S	54"-60"	Toluene	(mg/g)	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.2	<0.20	<0.005	6.4	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.005	<0.0043	<0.0043	<0.0043
CELL-2-S	54"-60"	Xylenes	(mg/g)	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.2	<0.20	<0.005	<0.5	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.005	0.0026	0.0017	<0.013
CELL-2-S	54"-60"	Naphthalene	(mg/g)	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	<0.3	<0.30	<3.3	13	<0.3	<0.3	<0.3	<0.33	<0.3	<0.17	<0.17	<0.18	0.657	<0.19
CELL-2-S	54"-60"	Phenanthrene	(mg/g)	< 0.3	< 0.3	1.8	< 0.3	< 0.3	<0.3	<0.30	<3.3	NR	<0.3	<0.3	<0.3	<0.33	<0.3	<0.17	<0.17	0.104	0.881	<0.19
CELL-2-S	54"-60"	Beryllium	(mg/g)	NR	0.4	0.2	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	54"-60"	Cadmium	(mg/g)	NR	< 0.1	0.2	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	54"-60"	Copper	(mg/g)	NR	3.7	26.6	NR	NR	NR	NR	NR	<0.005	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	54"-60"	Vanadium	(mg/g)	NR	7.3	26.2	NR	NR	NR	NR	NR	<0.005	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	54"-60"	Zinc	(mg/g)	NR	8.6	123	NR	NR	NR	NR	NR	<0.005	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	54"-60"	Kjeldahl Nitrogen	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	<0.33	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	54"-60"	TOC	(mg/g)	940	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	54"-60"	Solids	% wt	NR	NR	NR	NR	NR	NR	NR	NR	87	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	54"-60"	pH	(stnd units)	7.7	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	54"-60"	Specific Conductar	(µmho/cm)	1440	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	54"-60"	Moisture	(%)	NR	NR	NR	NR	NR	NR	NR	NR	<0.33	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR

NA - Not Analyzed, NR - Not Required

Table VI.D.1.A - 2
SITE H HISTORICAL SOIL-CORE SOIL ANALYSIS
Alon USA LP - Big Spring Refinery

CELL #	Depth	Analyte	Standard	Jul-14	Jul-15	Jul-16	Jul-17	Jul-18	Jul-19	Jul-20	Jul-21	Jul-22	Jul-23
CELL-2-S	33"-54"	Arsenic	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	33"-54"	Chromium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	33"-54"	Lead	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	33"-54"	Nickel	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	33"-54"	Selenium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	33"-54"	Benzene	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	33"-54"	Toluene	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	33"-54"	Xylenes, totals	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	33"-54"	Naphthalene	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	33"-54"	Phenanthrene	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	33"-54"	Beryllium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	33"-54"	Cadmium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	33"-54"	Copper	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	33"-54"	Vanadium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	33"-54"	Zinc	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	33"-54"	Kjeldahl Nitrogen	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	33"-54"	TOC	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	33"-54"	Solids	% wt	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	33"-54"	pH	(stnd units)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	33"-54"	Specific Conductar	(µmho/cm)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	33"-54"	Moisture	(%)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	54"-60"	Arsenic	(mg/g)	3.6	2.8	2.4	3.3	7.8	12.8	3.4	3.7	2.2	3.2
CELL-2-S	54"-60"	Chromium	(mg/g)	31.4	19.6	25.2	30.1	259	413	14	24.7	16.6	25.9
CELL-2-S	54"-60"	Lead	(mg/g)	14.8	9.5	13.6	12.9	356	150	8.3	13.1	8.3	13.3
CELL-2-S	54"-60"	Nickel	(mg/g)	15.1	16.6	16	12.9	14.1	17.9	10.6	18.2	11.1	16.6
CELL-2-S	54"-60"	Selenium	(mg/g)	0.48	0.5	<1.1	1.1J	5.3	7.7	<2.5	4.8	1.5	2.40 J
CELL-2-S	54"-60"	Benzene	(mg/g)	<0.0041	<0.00073	0.0168	<0.0013	<0.0013	<0.0003	<0.00041	<0.0031	<0.00018	<0.00021
CELL-2-S	54"-60"	Toluene	(mg/g)	<0.0041	<0.0011	0.0016	<0.0015	<0.0013	0.0012 J	<0.0033	<0.0031	<0.00016	0.00085
CELL-2-S	54"-60"	Xylenes	(mg/g)	<0.012	<0.003	0.0132	<0.0017	<0.0013	<0.0011	<0.0033	<0.0031	<0.0010	0.0028
CELL-2-S	54"-60"	Naphthalene	(mg/g)	<0.19	<0.03	<0.027	<0.024	<0.093	<0.046	<0.18	<0.024	0.0188	<0.0053
CELL-2-S	54"-60"	Phenanthrene	(mg/g)	<0.19	<0.043	<0.038	<0.025	<0.094	<0.046	<0.18	<0.024	0.212	<0.0013
CELL-2-S	54"-60"	Beryllium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	54"-60"	Cadmium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	54"-60"	Copper	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	54"-60"	Vanadium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	54"-60"	Zinc	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	54"-60"	Kjeldahl Nitrogen	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	54"-60"	TOC	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	54"-60"	Solids	% wt	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	54"-60"	pH	(stnd units)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	54"-60"	Specific Conductar	(µmho/cm)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-2-S	54"-60"	Moisture	(%)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR

NA - Not Analyzed, NR - Not Required

Table VI.D.1.A - 2
SITE H HISTORICAL SOIL-CORE SOIL ANALYSIS
Alon USA LP - Big Spring Refinery

CELL #	Depth	Analyte	Standard	Jan-95	Jul-95	Jan-96	Jul-96	Jan-97	Jul-97	Jan-98	Jul-98	Jan-99	Jul-04	Jul-05	Jul-06	Jul-07	Jul-08	Jul-09	Jul-10	Jul-11	Jul-12	Jul-13
CELL-3-N	0" - 12"	Arsenic	(mg/g)	9	1.2	22.2	13.5	17	19	10	11	13.5	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	0" - 12"	Chromium	(mg/g)	242	3.8	733	166	470	280	680	520	0.4	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	0" - 12"	Lead	(mg/g)	177	2.9	181	122(3)	3,440(3)	1700	440	161	<0.3	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	0" - 12"	Nickel	(mg/g)	9.9	2.7	18.8	16	21	24	28	26	488	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	0" - 12"	Selenium	(mg/g)	9.3	< 0.5	20.7	7.3	22	13	24	16	63.2	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	0" - 12"	Benzene	(mg/g)	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.2	<0.20	<0.005	21.1	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	0" - 12"	Toluene	(mg/g)	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.2	<0.20	<0.005	303	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	0" - 12"	Xylenes, totals	(mg/g)	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.2	<0.20	0.011	24.3	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	0" - 12"	Naphthalene	(mg/g)	* < 4.0	< 0.3	< 0.3	< 0.3	0.54	<0.3	* <0.60	<26	18	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	0" - 12"	Phenanthrene	(mg/g)	* < 4.0	< 0.3	< 0.3	1.8	< 0.3	<0.3	* <0.60	<26	1300	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	0" - 12"	Beryllium	(mg/g)	0.3	0.3	NA	0.2	< 1.0	0.2	0.52	0.3	28.5	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	0" - 12"	Cadmium	(mg/g)	0.4	< 0.1	NA	0.2	< 1.0	0.7	0.48	0.35	263	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	0" - 12"	Copper	(mg/g)	22.9	1.8	NA	26.6	48	29	58	31	0.007	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	0" - 12"	Vanadium	(mg/g)	16.3	5	NA	26.2	28	47	32	24.2	0.012	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	0" - 12"	Zinc	(mg/g)	125	6	NA	123	240	180	350	194	0.024	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	0" - 12"	Kjeldahl Nitrogen	(mg/g)	2800	NA	NA	NA	3030	NA	2900	NA	<2.6	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	0" - 12"	TOC	(mg/g)	2800	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	0" - 12"	Solids	% wt	NR	NR	NR	NR	NR	NR	NR	NR	82	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	0" - 12"	pH	(stnd units)	7.7	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	0" - 12"	Specific Conductar	(µmho/cm)	5000	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	0" - 12"	Moisture	(%)	87	NR	NR	NR	26.3	NR	20.55	NA	<2.6	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	12"-33"	Arsenic	(mg/g)	4	6.2	4.8	22.2	1.4	5.3	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	12"-33"	Chromium	(mg/g)	97.5	291	165	733	7	170	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	12"-33"	Lead	(mg/g)	29.9	134	102	181	23	32.2	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	12"-33"	Nickel	(mg/g)	10.4	14.1	10	18.8	11	18.3	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	12"-33"	Selenium	(mg/g)	< 0.5	2.4	0.8	20.7	< 1.0	<0.5	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	12"-33"	Benzene	(mg/g)	< 0.2	0.7	< 0.2	< 0.2	< 0.2	<0.2	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	12"-33"	Toluene	(mg/g)	< 0.2	4.5	< 0.2	< 0.2	< 0.2	<0.2	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	12"-33"	Xylenes, totals	(mg/g)	< 0.2	22.4	0.6	< 0.2	< 0.2	<0.2	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	12"-33"	Naphthalene	(mg/g)	* < 4.0	8	* 1.6	< 0.3	< 0.3	3.3	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	12"-33"	Phenanthrene	(mg/g)	* < 4.0	19	* 4.6	< 0.3	< 0.3	12	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	12"-33"	Beryllium	(mg/g)	NR	0.4	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	12"-33"	Cadmium	(mg/g)	NR	0.3	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	12"-33"	Copper	(mg/g)	NR	16.4	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	12"-33"	Vanadium	(mg/g)	NR	15.2	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	12"-33"	Zinc	(mg/g)	NR	150	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	12"-33"	Kjeldahl Nitrogen	(mg/g)	NR	NA	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	12"-33"	TOC	(mg/g)	2200	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	12"-33"	Solids	% wt	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	12"-33"	pH	(stnd units)	8.5	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	12"-33"	Specific Conductar	(µmho/cm)	1250	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	12"-33"	Moisture	(%)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR

NA - Not Analyzed, NR - Not Required

Table VI.D.1.A - 2
SITE H HISTORICAL SOIL-CORE SOIL ANALYSIS
Alon USA LP - Big Spring Refinery

CELL #	Depth	Analyte	Standard	Jul-14	Jul-15	Jul-16	Jul-17	Jul-18	Jul-19	Jul-20	Jul-21	Jul-22	Jul-23
CELL-3-N	0" - 12"	Arsenic	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	0" - 12"	Chromium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	0" - 12"	Lead	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	0" - 12"	Nickel	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	0" - 12"	Selenium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	0" - 12"	Benzene	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	0" - 12"	Toluene	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	0" - 12"	Xylenes, totals	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	0" - 12"	Naphthalene	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	0" - 12"	Phenanthrene	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	0" - 12"	Beryllium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	0" - 12"	Cadmium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	0" - 12"	Copper	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	0" - 12"	Vanadium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	0" - 12"	Zinc	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	0" - 12"	Kjeldahl Nitrogen	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	0" - 12"	TOC	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	0" - 12"	Solids	% wt	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	0" - 12"	pH	(stnd units)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	0" - 12"	Specific Conductar	(µmho/cm)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	0" - 12"	Moisture	(%)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	12"-33"	Arsenic	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	12"-33"	Chromium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	12"-33"	Lead	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	12"-33"	Nickel	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	12"-33"	Selenium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	12"-33"	Benzene	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	12"-33"	Toluene	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	12"-33"	Xylenes, totals	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	12"-33"	Naphthalene	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	12"-33"	Phenanthrene	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	12"-33"	Beryllium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	12"-33"	Cadmium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	12"-33"	Copper	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	12"-33"	Vanadium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	12"-33"	Zinc	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	12"-33"	Kjeldahl Nitrogen	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	12"-33"	TOC	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	12"-33"	Solids	% wt	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	12"-33"	pH	(stnd units)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	12"-33"	Specific Conductar	(µmho/cm)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	12"-33"	Moisture	(%)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR

NA - Not Analyzed, NR - Not Required

Table VI.D.1.A - 2
SITE H HISTORICAL SOIL-CORE SOIL ANALYSIS
Alon USA LP - Big Spring Refinery

CELL #	Depth	Analyte	Standard	Jan-95	Jul-95	Jan-96	Jul-96	Jan-97	Jul-97	Jan-98	Jul-98	Jan-99	Jul-04	Jul-05	Jul-06	Jul-07	Jul-08	Jul-09	Jul-10	Jul-11	Jul-12	Jul-13
CELL-3-N	33"-54"	Arsenic	(mg/g)	2.9	0.97	1.8	4.8	1.8	2.3	< 0.50	3	2.5	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	33"-54"	Chromium	(mg/g)	6.4	3.6	9.3	165	9.9	13.9	10	13	NA	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	33"-54"	Lead	(mg/g)	6.5	13.9	38.4(3)	102	18	3.4	19	17.9	NA	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	33"-54"	Nickel	(mg/g)	6.5	77.4	2.5	10	11	11.8	11	16	19	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	33"-54"	Selenium	(mg/g)	< 0.5	< 0.5	< 0.5	0.8	< 1.0	<0.5	<0.50	<1	NA	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	33"-54"	Benzene	(mg/g)	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.2	<0.20	<0.005	12.4	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	33"-54"	Toluene	(mg/g)	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.2	<0.20	<0.005	34.1	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	33"-54"	Xylenes, totals	(mg/g)	< 0.2	< 0.2	< 0.2	0.6	< 0.2	<0.2	<0.20	<0.005	<0.5	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	33"-54"	Naphthalene	(mg/g)	< 0.3	< 0.3	* < 0.3	* 1.6	< 0.3	<0.3	<0.30	<1.6	9	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	33"-54"	Phenanthrene	(mg/g)	< 0.3	< 0.3	* < 0.3	* 4.6	< 0.3	<0.3	<0.30	<1.6	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	33"-54"	Beryllium	(mg/g)	NR	0.21	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	33"-54"	Cadmium	(mg/g)	NR	< 0.2	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	33"-54"	Copper	(mg/g)	NR	3.2	NR	NR	NR	NR	NR	NR	<0.005	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	33"-54"	Vanadium	(mg/g)	NR	5	NR	NR	NR	NR	NR	NR	<0.005	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	33"-54"	Zinc	(mg/g)	NR	3.2	NR	NR	NR	NR	NR	NR	<0.005	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	33"-54"	Kjeldahl Nitrogen	(mg/g)	NR	NA	NR	NR	NR	NR	NR	NR	<0.33	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	33"-54"	TOC	(mg/g)	530	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	33"-54"	Solids	% wt	NR	NR	NR	NR	NR	NR	NR	NR	91	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	33"-54"	pH	(stnd units)	8	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	33"-54"	Specific Conductar	(µmho/cm)	1000	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	33"-54"	Moisture	(%)	NR	NR	NR	NR	NR	NR	NR	NR	<0.33	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	54"-60"	Arsenic	(mg/g)	2.2	1.6	14.6	1.8	2.4	1.6	< 0.50	2	2.2	3.78	2.03	4.89	<10	3.29	4.48	4.95	3.3	4.4	4.5
CELL-3-N	54"-60"	Chromium	(mg/g)	4.5	2.3	455	9.3	15	8.4	9.3	6	NA	30.2	9.11	93.4	7.37	43.4	70.1	74.2	42.3	49.3	56.3
CELL-3-N	54"-60"	Lead [total]	(mg/g)	4.6	6	184	38.4(3)	8.1(3)	15.6	23	15.6	NA	47.9	6.3	116	5.86	91.1	149	79.1	80.4	47.3	64.7
CELL-3-N	54"-60"	Nickel	(mg/g)	3.7	2	16.4	2.5	11	7.9	7.6	7.6	18	14.1	9.23	16.1	8.23	12.2	11.0	15.7	13.9	18.7	16.7
CELL-3-N	54"-60"	Selenium	(mg/g)	< 0.5	< 0.5	4.1	< 0.5	< 1.0	<0.5	< 0.50	<1	NA	0.792	<0.5	1.73	<10	0.722	3.56	1.62	0.84	0.48	1.1
CELL-3-N	54"-60"	Benzene	(mg/g)	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.2	<0.20	<0.005	12.7	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.005	<0.0043	<0.0044	<0.0041
CELL-3-N	54"-60"	Toluene	(mg/g)	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.2	<0.20	<0.005	9.3	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.005	<0.0043	<0.0044	<0.0041
CELL-3-N	54"-60"	Xylenes	(mg/g)	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.2	<0.20	<0.005	<1	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.005	<0.013	<0.013	<0.012
CELL-3-N	54"-60"	Naphthalene	(mg/g)	< 0.3	< 0.3	< 0.3	* < 0.3	< 0.3	<0.3	<0.30	<3.3	10	<0.3	<0.3	<0.3	<0.33	<0.3	<0.17	<0.84	<0.19	<0.2	<0.2
CELL-3-N	54"-60"	Phenanthrene	(mg/g)	< 0.3	< 0.3	1	* < 0.3	< 0.3	<0.3	<0.30	<3.3	NR	<0.3	<0.3	<0.3	<0.33	<0.3	<0.17	<0.84	<0.19	<0.2	<0.2
CELL-3-N	54"-60"	Beryllium	(mg/g)	NR	0.2	0.3	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	54"-60"	Cadmium	(mg/g)	NR	< 0.1	0.2	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	54"-60"	Copper	(mg/g)	NR	4	25.1	NR	NR	NR	NR	NR	<0.005	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	54"-60"	Vanadium	(mg/g)	NR	6.5	34.5	NR	NR	NR	NR	NR	<0.005	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	54"-60"	Zinc	(mg/g)	NR	< 1.0	242	NR	NR	NR	NR	NR	<0.005	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	54"-60"	Kjeldahl Nitrogen	(mg/g)	NR	NA	NA	NR	NR	NR	NR	NR	<0.33	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	54"-60"	TOC	(mg/g)	510	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	54"-60"	Solids	% wt	NR	NR	NR	NR	NR	NR	NR	NR	90	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	54"-60"	pH	(stnd units)	8.5	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	54"-60"	Specific Conductar	(µmho/cm)	1140	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	54"-60"	Moisture	(%)	NR	NR	NR	NR	NR	NR	NR	NR	<0.33	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR

NA - Not Analyzed, NR - Not Required

Table VI.D.1.A - 2
SITE H HISTORICAL SOIL-CORE SOIL ANALYSIS
Alon USA LP - Big Spring Refinery

CELL #	Depth	Analyte	Standard	Jul-14	Jul-15	Jul-16	Jul-17	Jul-18	Jul-19	Jul-20	Jul-21	Jul-22	Jul-23
CELL-3-N	33"-54"	Arsenic	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	33"-54"	Chromium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	33"-54"	Lead	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	33"-54"	Nickel	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	33"-54"	Selenium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	33"-54"	Benzene	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	33"-54"	Toluene	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	33"-54"	Xylenes, totals	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	33"-54"	Naphthalene	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	33"-54"	Phenanthrene	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	33"-54"	Beryllium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	33"-54"	Cadmium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	33"-54"	Copper	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	33"-54"	Vanadium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	33"-54"	Zinc	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	33"-54"	Kjeldahl Nitrogen	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	33"-54"	TOC	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	33"-54"	Solids	% wt	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	33"-54"	pH	(stnd units)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	33"-54"	Specific Conductar	(µmho/cm)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	33"-54"	Moisture	(%)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	54"-60"	Arsenic	(mg/g)	5.3	6.9	4.8	3	5.2	19	4.9	5	5.5	4.8
CELL-3-N	54"-60"	Chromium	(mg/g)	40	137	56.2	15.8	95.9	535	47.6	71.1	76.5	64.5
CELL-3-N	54"-60"	Lead [total]	(mg/g)	62.2	391	51.6	13	1580	582	53.9	73.8	155	138
CELL-3-N	54"-60"	Nickel	(mg/g)	24.5	22.5	18.3	16.2	20	38.1	28.6	17.8	19.9	15.2
CELL-3-N	54"-60"	Selenium	(mg/g)	0.36	4.4	<1.1	1.5J	5.2	24.5	<2.5	5.4	4.1	3.1
CELL-3-N	54"-60"	Benzene	(mg/g)	<0.0042	<0.00075	<0.0039	<0.0017	<0.0015	<0.00029	<0.00043	<0.0031	<0.00020	0.0016
CELL-3-N	54"-60"	Toluene	(mg/g)	<0.0042	<0.0011	<0.0039	<0.0019	<0.0015	0.0067	<0.0034	<0.0031	<0.00018	0.0055 J
CELL-3-N	54"-60"	Xylenes	(mg/g)	<0.013	<0.0031	<0.012	<0.0023	<0.0015	<0.0011	<0.0034	<0.0031	<0.0012	0.0025
CELL-3-N	54"-60"	Naphthalene	(mg/g)	<0.18	0.0543 J	<0.140	<0.0024	<0.096	<0.044	<0.91	<0.024	0.0164	<0.0050
CELL-3-N	54"-60"	Phenanthrene	(mg/g)	<0.18	2.61	<0.190	<0.0024	<0.097	<0.045	<0.91	<0.024	0.0401	<0.0013
CELL-3-N	54"-60"	Beryllium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	54"-60"	Cadmium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	54"-60"	Copper	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	54"-60"	Vanadium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	54"-60"	Zinc	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	54"-60"	Kjeldahl Nitrogen	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	54"-60"	TOC	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	54"-60"	Solids	% wt	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	54"-60"	pH	(stnd units)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	54"-60"	Specific Conductar	(µmho/cm)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-N	54"-60"	Moisture	(%)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR

NA - Not Analyzed, NR - Not Required

Table VI.D.1.A - 2
SITE H HISTORICAL SOIL-CORE SOIL ANALYSIS
Alon USA LP - Big Spring Refinery

CELL #	Depth	Analyte	Standard	Jan-95	Jul-95	Jan-96	Jul-96	Jan-97	Jul-97	Jan-98	Jul-98	Jan-99	Jul-04	Jul-05	Jul-06	Jul-07	Jul-08	Jul-09	Jul-10	Jul-11	Jul-12	Jul-13
CELL-3-S	0" - 12"	Arsenic	(mg/g)	12	1.5	9.1	14.6	11	17	6.3	3	1.9	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	0" - 12"	Chromium	(mg/g)	551	2.5	399	455	450	520	440	59	0.5	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	0" - 12"	Lead	(mg/g)	172	7.8	104	184	220	210	140	13.7	<0.3	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	0" - 12"	Nickel	(mg/g)	19.1	1.6	11.4	16.4	21	32	23	4.1	15.5	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	0" - 12"	Selenium	(mg/g)	4.1	< 0.5	2	4.1	4.1	4.7	3.5	<1	6.9	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	0" - 12"	Benzene	(mg/g)	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.2	<0.20	<0.025	9.9	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	0" - 12"	Toluene	(mg/g)	< 0.2	< 0.2	0.3	< 0.2	< 0.2	<0.2	<0.20	0.03	10.1	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	0" - 12"	Xylenes, totals	(mg/g)	< 0.2	< 0.2	1.1	< 0.2	< 0.2	0.5	<0.20	0.27	<1	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	0" - 12"	Naphthalene	(mg/g)	* < 4.0	< 0.3	* 4.4	< 0.3	< 0.3	4.3	* < 5	1.2 J	13	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	0" - 12"	Phenanthrene	(mg/g)	6.8	< 0.3	* 7.3	1	1.3	5.1	13	1.4 J	120	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	0" - 12"	Beryllium	(mg/g)	0.4	0.2	NR	0.3	< 1.0	0.4	0.6	0.5	16	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	0" - 12"	Cadmium	(mg/g)	0.4	< 0.1	NR	0.2	< 1.0	0.7	0.33	<0.05	16	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	0" - 12"	Copper	(mg/g)	36.6	2.7	NR	25.1	28	27	23	4.3	<0.005	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	0" - 12"	Vanadium	(mg/g)	22.9	6.2	NR	34.5	30	63	33	21.4	<0.005	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	0" - 12"	Zinc	(mg/g)	357	2.5	NR	242	290	310	230	31	<0.005	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	0" - 12"	Kjeldahl Nitrogen	(mg/g)	620	NR	NR	NR	867	NR	940	NA	<0.33	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	0" - 12"	TOC	(mg/g)	11000	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	0" - 12"	Solids	% wt	NR	NR	NR	NR	NR	NR	NR	NR	87	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	0" - 12"	pH	(stnd units)	8.1	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	0" - 12"	Specific Conductar	(µmho/cm)	2220	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	0" - 12"	Moisture	(%)	83	NR	NR	NR	NR	NR	17.45	NA	<0.33	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	12"-33"	Arsenic	(mg/g)	6.5	2.8	1	9.1	2.3	4.6	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	12"-33"	Chromium	(mg/g)	245	72.8	2.7	399	54	170	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	12"-33"	Lead	(mg/g)	72	22.6	3.8	104	15	39	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	12"-33"	Nickel	(mg/g)	12.5	7.9	1.3	11.4	7.5	13.7	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	12"-33"	Selenium	(mg/g)	1.8	< 0.5	< 0.5	2	< 1.0	<0.5	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	12"-33"	Benzene	(mg/g)	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.2	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	12"-33"	Toluene	(mg/g)	< 0.2	0.2	< 0.2	0.3	< 0.2	<0.2	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	12"-33"	Xylenes, totals	(mg/g)	< 0.2	3.4	< 0.2	1.1	0.22	1	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	12"-33"	Naphthalene	(mg/g)	* < 4.0	* < 0.6	< 0.3	* 4.4	< 0.3	11	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	12"-33"	Phenanthrene	(mg/g)	* < 4.0	2.5	< 0.3	* 7.3	4.8	9.2	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	12"-33"	Beryllium	(mg/g)	NR	0.4	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	12"-33"	Cadmium	(mg/g)	NR	0.1	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	12"-33"	Copper	(mg/g)	NR	7.4	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	12"-33"	Vanadium	(mg/g)	NR	9	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	12"-33"	Zinc	(mg/g)	NR	42.4	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	12"-33"	Kjeldahl Nitrogen	(mg/g)	NR	NA	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	12"-33"	TOC	(mg/g)	35900	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	12"-33"	Solids	% wt	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	12"-33"	pH	(stnd units)	8	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	12"-33"	Specific Conductar	(µmho/cm)	2560	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	12"-33"	Moisture	(%)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR

NA - Not Analyzed, NR - Not Required

Table VI.D.1.A - 2
SITE H HISTORICAL SOIL-CORE SOIL ANALYSIS
Alon USA LP - Big Spring Refinery

CELL #	Depth	Analyte	Standard	Jul-14	Jul-15	Jul-16	Jul-17	Jul-18	Jul-19	Jul-20	Jul-21	Jul-22	Jul-23
CELL-3-S	0" - 12"	Arsenic	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	0" - 12"	Chromium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	0" - 12"	Lead	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	0" - 12"	Nickel	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	0" - 12"	Selenium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	0" - 12"	Benzene	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	0" - 12"	Toluene	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	0" - 12"	Xylenes, totals	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	0" - 12"	Naphthalene	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	0" - 12"	Phenanthrene	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	0" - 12"	Beryllium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	0" - 12"	Cadmium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	0" - 12"	Copper	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	0" - 12"	Vanadium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	0" - 12"	Zinc	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	0" - 12"	Kjeldahl Nitrogen	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	0" - 12"	TOC	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	0" - 12"	Solids	% wt	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	0" - 12"	pH	(stnd units)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	0" - 12"	Specific Conductar	(µmho/cm)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	0" - 12"	Moisture	(%)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	12"-33"	Arsenic	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	12"-33"	Chromium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	12"-33"	Lead	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	12"-33"	Nickel	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	12"-33"	Selenium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	12"-33"	Benzene	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	12"-33"	Toluene	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	12"-33"	Xylenes, totals	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	12"-33"	Naphthalene	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	12"-33"	Phenanthrene	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	12"-33"	Beryllium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	12"-33"	Cadmium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	12"-33"	Copper	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	12"-33"	Vanadium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	12"-33"	Zinc	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	12"-33"	Kjeldahl Nitrogen	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	12"-33"	TOC	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	12"-33"	Solids	% wt	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	12"-33"	pH	(stnd units)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	12"-33"	Specific Conductar	(µmho/cm)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	12"-33"	Moisture	(%)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR

NA - Not Analyzed, NR - Not Required

Table VI.D.1.A - 2
SITE H HISTORICAL SOIL-CORE SOIL ANALYSIS
Alon USA LP - Big Spring Refinery

CELL #	Depth	Analyte	Standard	Jan-95	Jul-95	Jan-96	Jul-96	Jan-97	Jul-97	Jan-98	Jul-98	Jan-99	Jul-04	Jul-05	Jul-06	Jul-07	Jul-08	Jul-09	Jul-10	Jul-11	Jul-12	Jul-13
CELL-3-S	33"-54"	Arsenic	(mg/g)	1.9	1.6	1	1	1.3	1.8	< 0.50	2	1.8	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	33"-54"	Chromium	(mg/g)	3.8	2.9	2.5	2.7	5.7	10.2	9.9	6	NA	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	33"-54"	Lead	(mg/g)	3.7	3.7	3	3.8	4.4	<0.5	4.5	6.8	NA	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	33"-54"	Nickel	(mg/g)	2.5	3	1	1.3	9.1	9.3	7.9	5.2	23.4	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	33"-54"	Selenium	(mg/g)	< 0.5	< 0.5	< 0.5	< 0.5	< 1.0	<0.5	< 0.50	<1	NA	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	33"-54"	Benzene	(mg/g)	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.2	<0.20	<0.005	16.6	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	33"-54"	Toluene	(mg/g)	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.2	<0.20	<0.005	8.1	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	33"-54"	Xylenes, totals	(mg/g)	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.2	<0.20	<0.005	<1	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	33"-54"	Naphthalene	(mg/g)	< 0.3	< 0.3	* < 0.3	< 0.3	< 0.3	<0.3	<0.30	<1.6	13	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	33"-54"	Phenanthrene	(mg/g)	< 0.3	< 0.3	* < 0.3	< 0.3	< 0.3	<0.3	<0.30	<1.6	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	33"-54"	Beryllium	(mg/g)	NR	0.3	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	33"-54"	Cadmium	(mg/g)	NR	< 0.1	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	33"-54"	Copper	(mg/g)	NR	2.9	NR	NR	NR	NR	NR	NR	<0.005	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	33"-54"	Vanadium	(mg/g)	NR	5.8	NR	NR	NR	NR	NR	NR	<0.005	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	33"-54"	Zinc	(mg/g)	NR	4.9	NR	NR	NR	NR	NR	NR	<0.005	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	33"-54"	Kjeldahl Nitrogen	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	<0.33	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	33"-54"	TOC	(mg/g)	1400	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	33"-54"	Solids	% wt	NR	NR	NR	NR	NR	NR	NR	NR	87	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	33"-54"	pH	(stnd units)	8	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	33"-54"	Specific Conductar	(µmho/cm)	1220	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	33"-54"	Moisture	(%)	NR	NR	NR	NR	NR	NR	NR	NR	<0.33	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	54"-60"	Arsenic	(mg/g)	2	1.7	13.3	1	1.8	<0.5	<0.50	2	2.3	2.25	2.5	1.79	<10	2.45	2.41	2.59	1.8	3	2.6
CELL-3-S	54"-60"	Chromium	(mg/g)	5.8	6.2	303	2.5	16	<0.5	14	7	NR	13.3	17.2	6.81	5.86	9.01	7.98	13	15.9	23.2	15.8
CELL-3-S	54"-60"	Lead	(mg/g)	4.5	4.3	261	3	7.9	0.6	7.9	5.2	NR	9.12	10.9	4.76	<5	5.8	5.64	14.1	8.3	13.8	8.2
CELL-3-S	54"-60"	Nickel	(mg/g)	3	6.6	60.1	1	9.1	7.9	17	5.2	20.2	9.63	10.1	7.85	5.06	10	9.32	14	14.8	21.4	12.5
CELL-3-S	54"-60"	Selenium	(mg/g)	< 0.5	< 0.5	8	< 0.5	< 1.0	<0.5	< 0.50	<1	NR	<0.5	<0.5	<0.5	<10	<0.5	1.82	<0.5	<0.18	<0.19	0.46
CELL-3-S	54"-60"	Benzene	(mg/g)	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.2	<0.20	<0.005	10.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.005	<0.0041	<0.0046	<0.0045
CELL-3-S	54"-60"	Toluene	(mg/g)	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.2	<0.20	<0.005	6.8	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.005	<0.0041	<0.0046	<0.0045
CELL-3-S	54"-60"	Xylenes	(mg/g)	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.2	<0.20	<0.005	<0.5	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.005	<0.012	<0.014	<0.013
CELL-3-S	54"-60"	Naphthalene	(mg/g)	< 0.3	< 0.3	0.7	* < 0.3	< 0.3	<0.3	<0.30	<1.6	12	<0.3	<0.3	<0.3	<0.33	<0.3	<0.17	<0.17	<0.19	<0.2	<0.19
CELL-3-S	54"-60"	Phenanthrene	(mg/g)	< 0.3	< 0.3	0.9	* < 0.3	< 0.3	<0.3	<0.30	<1.6	NR	<0.3	<0.3	<0.3	<0.33	<0.3	<0.17	<0.17	<0.19	<0.2	<0.19
CELL-3-S	54"-60"	Beryllium	(mg/g)	NR	0.4	0.2	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	54"-60"	Cadmium	(mg/g)	NR	0.1	0.2	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	54"-60"	Copper	(mg/g)	NR	3.7	73.1	NR	NR	NR	NR	NR	<0.005	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	54"-60"	Vanadium	(mg/g)	NR	7.7	16.5	NR	NR	NR	NR	NR	<0.005	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	54"-60"	Zinc	(mg/g)	NR	9.9	215	NR	NR	NR	NR	NR	<0.005	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	54"-60"	Kjeldahl Nitrogen	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	<0.33	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	54"-60"	TOC	(mg/g)	1300	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	54"-60"	Solids	% wt	NR	NR	NR	NR	NR	NR	NR	NR	88	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	54"-60"	pH	(stnd units)	8	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	54"-60"	Specific Conductar	(µmho/cm)	1220	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	54"-60"	Moisture	(%)	NA	NR	NR	NR	NR	NR	NR	NR	<0.33	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR

NA - Not Analyzed, NR - Not Required

Table VI.D.1.A - 2
SITE H HISTORICAL SOIL-CORE SOIL ANALYSIS
Alon USA LP - Big Spring Refinery

CELL #	Depth	Analyte	Standard	Jul-14	Jul-15	Jul-16	Jul-17	Jul-18	Jul-19	Jul-20	Jul-21	Jul-22	Jul-23
CELL-3-S	33"-54"	Arsenic	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	33"-54"	Chromium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	33"-54"	Lead	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	33"-54"	Nickel	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	33"-54"	Selenium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	33"-54"	Benzene	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	33"-54"	Toluene	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	33"-54"	Xylenes, totals	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	33"-54"	Naphthalene	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	33"-54"	Phenanthrene	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	33"-54"	Beryllium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	33"-54"	Cadmium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	33"-54"	Copper	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	33"-54"	Vanadium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	33"-54"	Zinc	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	33"-54"	Kjeldahl Nitrogen	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	33"-54"	TOC	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	33"-54"	Solids	% wt	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	33"-54"	pH	(stnd units)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	33"-54"	Specific Conductar	(µmho/cm)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	33"-54"	Moisture	(%)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	54"-60"	Arsenic	(mg/g)	3.3	2.7	2.9	2.8	3.6	3	3.5	3.2	2.7	3.2
CELL-3-S	54"-60"	Chromium	(mg/g)	26.3	21.8	15.2	13.6	62.8	13.6	17.5	20.8	28.5	50.8
CELL-3-S	54"-60"	Lead	(mg/g)	12.9	24.9	16.4	8.4	38.7	11.4	10.7	15.8	13.5	13.5
CELL-3-S	54"-60"	Nickel	(mg/g)	15.4	16.4	16.2	15.3	12	13.3	17.2	15.3	11.5	14.8
CELL-3-S	54"-60"	Selenium	(mg/g)	0.41	0.52	<1.2	1.1J	<2.8	1.9 J	<2.6	3.9	1.9	2.8
CELL-3-S	54"-60"	Benzene	(mg/g)	<0.0044	<0.00073	<0.0035	<0.0014	<0.0013	<0.00027	<0.00039	<0.0031	<0.00019	0.00096
CELL-3-S	54"-60"	Toluene	(mg/g)	<0.0044	<0.0011	<0.0035	<0.0016	<0.0013	0.0065	<0.0031	<0.0031	<0.00018	0.00056 J
CELL-3-S	54"-60"	Xylenes	(mg/g)	<0.013	<0.003	<0.010	<0.0019	<0.0013	<0.001	<0.0031	<0.0031	<0.0011	<0.0012
CELL-3-S	54"-60"	Naphthalene	(mg/g)	<0.19	<0.029	<0.027	<0.23	<0.024	<0.044	<0.19	<0.024	<0.0053	<0.0052
CELL-3-S	54"-60"	Phenanthrene	(mg/g)	<0.19	<0.042	<0.038	<0.24	<0.024	<0.044	<0.19	<0.024	<0.0014	<0.0013
CELL-3-S	54"-60"	Beryllium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	54"-60"	Cadmium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	54"-60"	Copper	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	54"-60"	Vanadium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	54"-60"	Zinc	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	54"-60"	Kjeldahl Nitrogen	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	54"-60"	TOC	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	54"-60"	Solids	% wt	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	54"-60"	pH	(stnd units)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	54"-60"	Specific Conductar	(µmho/cm)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-3-S	54"-60"	Moisture	(%)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR

NA - Not Analyzed, NR - Not Required

Table VI.D.1.A - 2
SITE H HISTORICAL SOIL-CORE SOIL ANALYSIS
Alon USA LP - Big Spring Refinery

CELL #	Depth	Analyte	Standard	Jan-95	Jul-95	Jan-96	Jul-96	Jan-97	Jul-97	Jan-98	Jul-98	Jan-99	Jul-04	Jul-05	Jul-06	Jul-07	Jul-08	Jul-09	Jul-10	Jul-11	Jul-12	Jul-13
CELL-4-N	0" - 12"	Arsenic	(mg/g)	22	1.8	12	13.3	7.5	19	< 0.50	3	2.1	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	0" - 12"	Chromium	(mg/g)	502	22.3	386	303	290	420	44	38	0.4	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	0" - 12"	Lead	(mg/g)	202	10.7	200	261	220	300	41	25.6	<0.3	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	0" - 12"	Nickel	(mg/g)	75.3	6.7	36.2	60.1	21	49	19	10	20.1	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	0" - 12"	Selenium	(mg/g)	14.2	< 0.5	4.6	8	2.6	8.4	< 0.50	<1	5.3	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	0" - 12"	Benzene	(mg/g)	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.2	<0.20	<0.005	9.1	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	0" - 12"	Toluene	(mg/g)	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.2	<0.20	<0.005	10.5	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	0" - 12"	Xylenes, totals	(mg/g)	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.2	<0.20	<0.005	<0.5	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	0" - 12"	Naphthalene	(mg/g)	* < 4.0	< 0.3	* 0.3	0.7	< 0.3	<0.3	<0.30	<3.3	12	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	0" - 12"	Phenanthrene	(mg/g)	12	< 0.3	* 0.5	0.9	< 0.3	3.2	0.48	<3.3	110	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	0" - 12"	Beryllium	(mg/g)	0.3	0.4	NR	0.2	< 1.0	0.4	0.51	0.6	15.2	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	0" - 12"	Cadmium	(mg/g)	0.6	0.1	NR	0.2	< 1.0	0.9	0.2	0.11	18	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	0" - 12"	Copper	(mg/g)	150	4.2	NR	73.1	26	72	7.3	7.3	<0.005	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	0" - 12"	Vanadium	(mg/g)	29.4	7.2	NR	16.5	19	41	14	23.1	<0.005	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	0" - 12"	Zinc	(mg/g)	298	17.1	NR	215	180	300	43	29	<0.005	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	0" - 12"	Kjeldahl Nitrogen	(mg/g)	14500	NR	NR	NR	233	NA	250	NA	<0.33	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	0" - 12"	TOC	(mg/g)	4800	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	0" - 12"	Solids	% wt	NR	NR	NR	NR	NR	NR	NR	NR	88	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	0" - 12"	pH	(stnd units)	7.6	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	0" - 12"	Specific Conductar	(µmho/cm)	4000	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	0" - 12"	Moisture	(%)	83	NR	NR	NR	16.3	NR	11.04	NA	<0.33	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	12"-33"	Arsenic	(mg/g)	2.7	26.4	0.8	12	1.8	3.1	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	12"-33"	Chromium	(mg/g)	7.6	403	2.9	386	6.1	18.4	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	12"-33"	Lead	(mg/g)	8.3	245	5.1	200	4.2	2.8	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	12"-33"	Nickel	(mg/g)	7.6	194	1.7	36.2	8.6	20.1	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	12"-33"	Selenium	(mg/g)	< 0.5	19.8	< 0.5	4.6	< 1.0	<0.5	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	12"-33"	Benzene	(mg/g)	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.2	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	12"-33"	Toluene	(mg/g)	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.2	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	12"-33"	Xylenes, totals	(mg/g)	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.2	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	12"-33"	Naphthalene	(mg/g)	< 0.3	* < 40	* < 0.3	* 0.3	< 0.3	<0.3	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	12"-33"	Phenanthrene	(mg/g)	< 0.3	* < 40	* < 0.3	* 0.5	< 0.3	<0.3	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	12"-33"	Beryllium	(mg/g)	NR	< 0.1	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	12"-33"	Cadmium	(mg/g)	NR	0.7	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	12"-33"	Copper	(mg/g)	NR	243	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	12"-33"	Vanadium	(mg/g)	NR	36.6	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	12"-33"	Zinc	(mg/g)	NR	311	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	12"-33"	Kjeldahl Nitrogen	(mg/g)	NR	NA	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	12"-33"	TOC	(mg/g)	440	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	12"-33"	Solids	% wt	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	12"-33"	pH	(stnd units)	8.2	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	12"-33"	Specific Conductar	(µmho/cm)	795	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	12"-33"	Moisture	(%)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR

NA - Not Analyzed, NR - Not Required

Table VI.D.1.A - 2
SITE H HISTORICAL SOIL-CORE SOIL ANALYSIS
Alon USA LP - Big Spring Refinery

CELL #	Depth	Analyte	Standard	Jul-14	Jul-15	Jul-16	Jul-17	Jul-18	Jul-19	Jul-20	Jul-21	Jul-22	Jul-23
CELL-4-N	0" - 12"	Arsenic	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	0" - 12"	Chromium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	0" - 12"	Lead	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	0" - 12"	Nickel	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	0" - 12"	Selenium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	0" - 12"	Benzene	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	0" - 12"	Toluene	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	0" - 12"	Xylenes, totals	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	0" - 12"	Naphthalene	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	0" - 12"	Phenanthrene	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	0" - 12"	Beryllium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	0" - 12"	Cadmium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	0" - 12"	Copper	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	0" - 12"	Vanadium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	0" - 12"	Zinc	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	0" - 12"	Kjeldahl Nitrogen	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	0" - 12"	TOC	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	0" - 12"	Solids	% wt	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	0" - 12"	pH	(stnd units)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	0" - 12"	Specific Conductar	(µmho/cm)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	0" - 12"	Moisture	(%)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	12"-33"	Arsenic	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	12"-33"	Chromium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	12"-33"	Lead	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	12"-33"	Nickel	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	12"-33"	Selenium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	12"-33"	Benzene	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	12"-33"	Toluene	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	12"-33"	Xylenes, totals	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	12"-33"	Naphthalene	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	12"-33"	Phenanthrene	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	12"-33"	Beryllium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	12"-33"	Cadmium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	12"-33"	Copper	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	12"-33"	Vanadium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	12"-33"	Zinc	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	12"-33"	Kjeldahl Nitrogen	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	12"-33"	TOC	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	12"-33"	Solids	% wt	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	12"-33"	pH	(stnd units)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	12"-33"	Specific Conductar	(µmho/cm)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	12"-33"	Moisture	(%)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR

NA - Not Analyzed, NR - Not Required

Table VI.D.1.A - 2
SITE H HISTORICAL SOIL-CORE SOIL ANALYSIS
Alon USA LP - Big Spring Refinery

CELL #	Depth	Analyte	Standard	Jan-95	Jul-95	Jan-96	Jul-96	Jan-97	Jul-97	Jan-98	Jul-98	Jan-99	Jul-04	Jul-05	Jul-06	Jul-07	Jul-08	Jul-09	Jul-10	Jul-11	Jul-12	Jul-13
CELL-4-N	33"-54"	Arsenic	(mg/g)	2.2	1.8	1.6	0.8	1.4	5.2	< 0.50	3	2.2	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	33"-54"	Chromium	(mg/g)	4.6	2.9	9.7	2.9	2.7	13	11	5	NA	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	33"-54"	Lead	(mg/g)	4.4	2	10.4	5.1	4.1	4.9	5.5	9	NA	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	33"-54"	Nickel	(mg/g)	3.9	1.6	2.3	1.7	3.4	12.6	11	12	16.4	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	33"-54"	Selenium	(mg/g)	< 0.5	< 0.5	< 0.5	< 0.5	< 1.0	<0.5	< 0.50	<1	NA	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	33"-54"	Benzene	(mg/g)	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.2	<0.20	<0.005	9.1	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	33"-54"	Toluene	(mg/g)	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.2	<0.20	<0.005	6.1	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	33"-54"	Xylenes, totals	(mg/g)	0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.2	<0.20	<0.005	<0.5	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	33"-54"	Naphthalene	(mg/g)	< 0.3	* < 3	< 0.3	* < 0.3	< 0.3	<0.3	<0.30	<0.33	12	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	33"-54"	Phenanthrene	(mg/g)	< 0.3	* < 3	< 0.3	* < 0.3	< 0.3	<0.3	<0.30	<0.33	NA	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	33"-54"	Beryllium	(mg/g)	NR	0.3	NR	NR	NR	NR	NR	NR	NA	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	33"-54"	Cadmium	(mg/g)	NR	< 0.1	NR	NR	NR	NR	NR	NR	NA	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	33"-54"	Copper	(mg/g)	NR	4.5	NR	NR	NR	NR	NR	NR	<0.005	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	33"-54"	Vanadium	(mg/g)	NR	6.1	NR	NR	NR	NR	NR	NR	<0.005	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	33"-54"	Zinc	(mg/g)	NR	3.1	NR	NR	NR	NR	NR	NR	<0.005	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	33"-54"	Kjeldahl Nitrogen	(mg/g)	NA	NA	NR	NR	NR	NR	NR	NR	<0.33	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	33"-54"	TOC	(mg/g)	340	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	33"-54"	Solids	% wt	NR	NR	NR	NR	NR	NR	NR	NR	88	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	33"-54"	pH	(stnd units)	8	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	33"-54"	Specific Conductar	(µmho/cm)	777	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	33"-54"	Moisture	(%)	NR	NR	NR	NR	NR	NR	NR	NR	<0.33	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	54"-60"	Arsenic	(mg/g)	2.6	1.3	9.4	1.6	4.2	2.6	< 0.50	2	2.5	3.29	2.44	10.2	<10	3.05	3.41	2.68	2.3	2.4	3.3
CELL-4-N	54"-60"	Chromium	(mg/g)	5	2.1	210	9.7	62	13	9.5	50	NA	13.6	10.7	245	9.01	19.3	10.8	8.62	16.7	20.1	22.2
CELL-4-N	54"-60"	Lead	(mg/g)	4.3	2.6	200	10.4	8.5(3)	7.9	5.2	9.8	NA	10.6	6.61	122	10	12.4	7.96	6.13	8.2	11.5	13.6
CELL-4-N	54"-60"	Nickel	(mg/g)	4.1	1.2	7.9	2.3	21	11	11	10	23.1	16.1	12	46	10.6	14.6	13.3	9.46	15.3	15.4	15.2
CELL-4-N	54"-60"	Selenium	(mg/g)	< 0.5	< 0.5	5.4	< 0.5	1.2	<0.5	< 0.50	<1	NA	<0.5	<0.5	5.09	<10	<0.5	2.40	<0.5	0.19	<0.17	0.17
CELL-4-N	54"-60"	Benzene	(mg/g)	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.2	<0.20	<0.005	12.6	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.005	<0.0040	<0.0041	<0.0042
CELL-4-N	54"-60"	Toluene	(mg/g)	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.2	<0.20	<0.005	8	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.005	<0.0040	<0.0041	0.0036
CELL-4-N	54"-60"	Xylenes	(mg/g)	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.2	<0.20	<0.005	<1	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.005	<0.012	<0.012	0.0035
CELL-4-N	54"-60"	Naphthalene	(mg/g)	< 0.3	* < 3	< 0.3	< 0.3	< 0.3	<0.3	<0.30	<0.33	13	<0.3	<0.3	<0.3	<0.33	<0.3	<0.17	<0.17	<0.18	<0.18	<0.18
CELL-4-N	54"-60"	Phenanthrene	(mg/g)	< 0.3	* < 3	< 0.3	< 0.3	< 0.3	<0.3	<0.30	<0.33	NA	<0.3	<0.3	<0.3	<0.33	<0.3	<0.17	<0.17	<0.18	<0.18	<0.18
CELL-4-N	54"-60"	Beryllium	(mg/g)	NR	0.2	0.2	NR	NR	NR	NR	NR	NA	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	54"-60"	Cadmium	(mg/g)	NR	< 0.1	0.2	NR	NR	NR	NR	NR	NA	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	54"-60"	Copper	(mg/g)	NR	2.8	20.2	NR	NR	NR	NR	NR	<0.005	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	54"-60"	Vanadium	(mg/g)	NR	6	12	NR	NR	NR	NR	NR	<0.005	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	54"-60"	Zinc	(mg/g)	NR	2.9	137	NR	NR	NR	NR	NR	<0.005	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	54"-60"	Kjeldahl Nitrogen	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	<0.33	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	54"-60"	TOC	(mg/g)	640	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	54"-60"	Solids	% wt	NR	NR	NR	NR	NR	NR	NR	NR	87	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	54"-60"	pH	(stnd units)	8.1	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	54"-60"	Specific Conductar	(µmho/cm)	777	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	54"-60"	Moisture	(%)	NR	NR	NR	NR	NR	NR	NR	NR	<0.33	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR

NA - Not Analyzed, NR - Not Required

Table VI.D.1.A - 2
SITE H HISTORICAL SOIL-CORE SOIL ANALYSIS
Alon USA LP - Big Spring Refinery

CELL #	Depth	Analyte	Standard	Jul-14	Jul-15	Jul-16	Jul-17	Jul-18	Jul-19	Jul-20	Jul-21	Jul-22	Jul-23
CELL-4-N	33"-54"	Arsenic	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	33"-54"	Chromium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	33"-54"	Lead	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	33"-54"	Nickel	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	33"-54"	Selenium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	33"-54"	Benzene	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	33"-54"	Toluene	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	33"-54"	Xylenes, totals	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	33"-54"	Naphthalene	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	33"-54"	Phenanthrene	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	33"-54"	Beryllium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	33"-54"	Cadmium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	33"-54"	Copper	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	33"-54"	Vanadium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	33"-54"	Zinc	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	33"-54"	Kjeldahl Nitrogen	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	33"-54"	TOC	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	33"-54"	Solids	% wt	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	33"-54"	pH	(stnd units)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	33"-54"	Specific Conductar	(µmho/cm)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	33"-54"	Moisture	(%)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	54"-60"	Arsenic	(mg/g)	2.8	2.8	3.1	11.5	3.2	4	4.2	3.5	3.3	2.4
CELL-4-N	54"-60"	Chromium	(mg/g)	16.7	23	15.2	112	17.3	16.7	21.4	27.1	15.8	10.4
CELL-4-N	54"-60"	Lead	(mg/g)	10	12.7	10.9	93.4	14.7	16	14.3	17.5	10.1	6.8
CELL-4-N	54"-60"	Nickel	(mg/g)	14.7	14.2	18.6	21.2	13.5	17.9	19	16.1	15.3	11.5
CELL-4-N	54"-60"	Selenium	(mg/g)	0.43	0.47	<1.1	4.4	<2.8	2.9	<2.4	4	2	1.6 J
CELL-4-N	54"-60"	Benzene	(mg/g)	<0.0047	<0.00073	<0.0039	<0.0011	<0.0014	0.00055	<0.00042	<0.0031	<0.00025	0.00075
CELL-4-N	54"-60"	Toluene	(mg/g)	<0.0047	<0.0011	<0.0039	<0.0013	<0.0015	0.0052	<0.0033	<0.0031	<0.00023	0.00067 J
CELL-4-N	54"-60"	Xylenes	(mg/g)	<0.014	<0.003	<0.012	<0.0015	<0.0015	<0.0013	<0.0033	<0.0031	<0.0015	<0.0012
CELL-4-N	54"-60"	Naphthalene	(mg/g)	<0.20	<0.029	<0.027	<0.24	<0.024	<0.043	<0.18	<0.024	<0.0057	<0.0056
CELL-4-N	54"-60"	Phenanthrene	(mg/g)	<0.20	<0.041	<0.037	<0.24	<0.024	<0.044	<0.18	0.105	<0.0015	<0.0014
CELL-4-N	54"-60"	Beryllium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	54"-60"	Cadmium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	54"-60"	Copper	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	54"-60"	Vanadium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	54"-60"	Zinc	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	54"-60"	Kjeldahl Nitrogen	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	54"-60"	TOC	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	54"-60"	Solids	% wt	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	54"-60"	pH	(stnd units)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	54"-60"	Specific Conductar	(µmho/cm)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-N	54"-60"	Moisture	(%)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR

NA - Not Analyzed, NR - Not Required

Table VI.D.1.A - 2
SITE H HISTORICAL SOIL-CORE SOIL ANALYSIS
Alon USA LP - Big Spring Refinery

CELL #	Depth	Analyte	Standard	Jan-95	Jul-95	Jan-96	Jul-96	Jan-97	Jul-97	Jan-98	Jul-98	Jan-99	Jul-04	Jul-05	Jul-06	Jul-07	Jul-08	Jul-09	Jul-10	Jul-11	Jul-12	Jul-13
CELL-4-S	0" - 12"	Arsenic	(mg/g)	8.6	1.3	5.9	9.4	5	11	8.4	8	3	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	0" - 12"	Chromium	(mg/g)	308	2.6	202	210	180	290	400	294	0.6	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	0" - 12"	Lead	(mg/g)	229	3.8	471	200	180	700	260	451	<0.3	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	0" - 12"	Nickel	(mg/g)	11.6	1.5	7.2	7.9	9.1	17	19	7.3	33.9	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	0" - 12"	Selenium	(mg/g)	4.8	< 0.5	0.8	5.4	2.9	9.9	3	5	11.3	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	0" - 12"	Benzene	(mg/g)	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.2	<0.20	<0.005	13.1	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	0" - 12"	Toluene	(mg/g)	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.2	0.22	0.005	26.7	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	0" - 12"	Xylenes, totals	(mg/g)	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.2	5.5	0.014	<0.5	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	0" - 12"	Naphthalene	(mg/g)	* < 4.0	* < 6	< 0.3	< 0.3	< 0.3	<0.3	10	<16	12	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	0" - 12"	Phenanthrene	(mg/g)	* < 4.0	* < 6	2.4	< 0.3	0.55	<0.3	11	<16	220	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	0" - 12"	Beryllium	(mg/g)	0.3	0.2	NR	0.2	< 1.0	<0.1	0.59	0.4	20.6	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	0" - 12"	Cadmium	(mg/g)	0.3	< 0.1	NR	0.2	< 1.0	0.3	0.35	0.07	25	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	0" - 12"	Copper	(mg/g)	24.8	0.9	NR	20.2	14	27	25	5.7	0.014	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	0" - 12"	Vanadium	(mg/g)	15.3	5.8	NR	12	12	23	26	20.9	0.031	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	0" - 12"	Zinc	(mg/g)	160	3	NR	137	120	200	210	154	0.069	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	0" - 12"	Kjeldahl Nitrogen	(mg/g)	540	NR	NR	NR	1420	NR	380	NR	0.41	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	0" - 12"	TOC	(mg/g)	24900	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	0" - 12"	Solids	% wt	NR	NR	NR	NR	NR	NR	NR	NR	88	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	0" - 12"	pH	(stnd units)	7.8	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	0" - 12"	Specific Conductar	(µmho/cm)	2610	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	0" - 12"	Moisture	(%)	84	NR	NR	NR	12.8	NR	14.62	NR	<0.33	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	12"-33"	Arsenic	(mg/g)	6.2	6.3	0.8	5.9	1.8	2.3	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	12"-33"	Chromium	(mg/g)	7.3	253	1.5	202	11	12	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	12"-33"	Lead	(mg/g)	13.4	631	3.9	471	6	12	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	12"-33"	Nickel	(mg/g)	96.5	12.1	1.7	7.2	15	11	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	12"-33"	Selenium	(mg/g)	< 0.5	1.7	< 0.5	0.8	< 1.0	<0.5	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	12"-33"	Benzene	(mg/g)	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.2	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	12"-33"	Toluene	(mg/g)	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.2	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	12"-33"	Xylenes, totals	(mg/g)	< 0.2	0.4	< 0.2	< 0.2	< 0.2	<0.2	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	12"-33"	Naphthalene	(mg/g)	< 0.3	* < 4	< 0.3	< 0.3	< 0.3	<0.3	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	12"-33"	Phenanthrene	(mg/g)	< 0.3	7.2	< 0.3	2.4	< 0.3	<0.3	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	12"-33"	Beryllium	(mg/g)	NR	0.3	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	12"-33"	Cadmium	(mg/g)	NR	0.3	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	12"-33"	Copper	(mg/g)	NR	13.8	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	12"-33"	Vanadium	(mg/g)	NR	11.7	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	12"-33"	Zinc	(mg/g)	NR	140	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	12"-33"	Kjeldahl Nitrogen	(mg/g)	NR	NA	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	12"-33"	TOC	(mg/g)	390	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	12"-33"	Solids	% wt	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	12"-33"	pH	(stnd units)	8.2	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	12"-33"	Specific Conductar	(µmho/cm)	880	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	12"-33"	Moisture	(%)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR

NA - Not Analyzed, NR - Not Required

Table VI.D.1.A - 2
SITE H HISTORICAL SOIL-CORE SOIL ANALYSIS
Alon USA LP - Big Spring Refinery

CELL #	Depth	Analyte	Standard	Jul-14	Jul-15	Jul-16	Jul-17	Jul-18	Jul-19	Jul-20	Jul-21	Jul-22	Jul-23
CELL-4-S	0" - 12"	Arsenic	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	0" - 12"	Chromium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	0" - 12"	Lead	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	0" - 12"	Nickel	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	0" - 12"	Selenium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	0" - 12"	Benzene	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	0" - 12"	Toluene	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	0" - 12"	Xylenes, totals	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	0" - 12"	Naphthalene	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	0" - 12"	Phenanthrene	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	0" - 12"	Beryllium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	0" - 12"	Cadmium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	0" - 12"	Copper	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	0" - 12"	Vanadium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	0" - 12"	Zinc	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	0" - 12"	Kjeldahl Nitrogen	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	0" - 12"	TOC	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	0" - 12"	Solids	% wt	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	0" - 12"	pH	(stnd units)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	0" - 12"	Specific Conductar	(µmho/cm)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	0" - 12"	Moisture	(%)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	12"-33"	Arsenic	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	12"-33"	Chromium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	12"-33"	Lead	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	12"-33"	Nickel	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	12"-33"	Selenium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	12"-33"	Benzene	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	12"-33"	Toluene	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	12"-33"	Xylenes, totals	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	12"-33"	Naphthalene	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	12"-33"	Phenanthrene	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	12"-33"	Beryllium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	12"-33"	Cadmium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	12"-33"	Copper	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	12"-33"	Vanadium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	12"-33"	Zinc	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	12"-33"	Kjeldahl Nitrogen	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	12"-33"	TOC	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	12"-33"	Solids	% wt	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	12"-33"	pH	(stnd units)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	12"-33"	Specific Conductar	(µmho/cm)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	12"-33"	Moisture	(%)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR

NA - Not Analyzed, NR - Not Required

Table VI.D.1.A - 2
SITE H HISTORICAL SOIL-CORE SOIL ANALYSIS
Alon USA LP - Big Spring Refinery

CELL #	Depth	Analyte	Standard	Jan-95	Jul-95	Jan-96	Jul-96	Jan-97	Jul-97	Jan-98	Jul-98	Jan-99	Jul-04	Jul-05	Jul-06	Jul-07	Jul-08	Jul-09	Jul-10	Jul-11	Jul-12	Jul-13
CELL-4-S	33"-54"	Arsenic	(mg/g)	2.1	1.9	1.6	0.8	1.7	2.8	< 0.50	3	2.5	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	33"-54"	Chromium	(mg/g)	5.8	9.2	5.8	1.5	9.2	14	106	7	NA	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	33"-54"	Lead	(mg/g)	5	31.7	6.9	3.9	5.4	8.9	6.2	8.1	NA	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	33"-54"	Nickel	(mg/g)	5.9	4.9	1.5	1.7	11	13	64	8.8	25.4	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	33"-54"	Selenium	(mg/g)	< 0.5	< 0.5	1.3	< 0.5	< 1.0	<0.5	< 0.50	<1	NA	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	33"-54"	Benzene	(mg/g)	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.2	<0.20	<0.005	13	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	33"-54"	Toluene	(mg/g)	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.2	<0.20	<0.005	9	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	33"-54"	Xylenes, totals	(mg/g)	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.2	<0.20	<0.005	<0.5	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	33"-54"	Naphthalene	(mg/g)	< 0.3	* < 0.6	< 0.3	< 0.3	< 0.3	<0.3	<0.30	<0.33	12	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	33"-54"	Phenanthrene	(mg/g)	< 0.3	* < 0.6	< 0.3	< 0.3	< 0.3	<0.3	<0.30	<0.33	NA	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	33"-54"	Beryllium	(mg/g)	NR	0.3	NR	NR	NR	NR	NR	NR	NA	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	33"-54"	Cadmium	(mg/g)	NR	< 0.1	NR	NR	NR	NR	NR	NR	NA	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	33"-54"	Copper	(mg/g)	NR	4.6	NR	NR	NR	NR	NR	NR	<0.005	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	33"-54"	Vanadium	(mg/g)	NR	6.7	NR	NR	NR	NR	NR	NR	<0.005	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	33"-54"	Zinc	(mg/g)	NR	10.7	NR	NR	NR	NR	NR	NR	<0.005	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	33"-54"	Kjeldahl Nitrogen	(mg/g)	NR	NA	NR	NR	NR	NR	NR	NR	<0.33	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	33"-54"	TOC	(mg/g)	740	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	33"-54"	Solids	% wt	NR	NR	NR	NR	NR	NR	NR	NR	88	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	33"-54"	pH	(stnd units)	8.3	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	33"-54"	Specific Conductar	(µmho/cm)	777	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	33"-54"	Moisture	(%)	NR	NR	NR	NR	NR	NR	NR	NR	<0.33	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	54"-60"	Arsenic	(mg/g)	2.5	0.9	1.6	1.6	1.8	3.1	< 0.50	2	2	2.84	2.55	2.24	<10	3.74	2.63	2.72	2.4	2.3	2.7
CELL-4-S	54"-60"	Chromium	(mg/g)	6.3	2.3	5.8	5.8	12	12	9.8	11	NA	13.4	13.6	13	11.5	28.4	13.8	11.8	15.5	14.6	18.2
CELL-4-S	54"-60"	Lead [total]	(mg/g)	5.4	2.2	6.9	6.9	6.6	7.9	5.2	6.9	NA	9.68	10.2	8.63	12.2	24	10.0	7.76	8	7.5	10.1
CELL-4-S	54"-60"	Nickel	(mg/g)	6.4	1.8	1.5	1.5	12	12	12	12	17.6	13.8	15.5	11.5	13	13.8	9.90	13.1	14.8	10.6	13.3
CELL-4-S	54"-60"	Selenium	(mg/g)	< 0.5	< 0.5	1.3	1.3	< 1.0	<0.5	< 0.50	<1	NA	<0.5	<0.5	<0.5	<10	<0.5	2.36	<0.5	<0.19	0.21	0.22
CELL-4-S	54"-60"	Benzene	(mg/g)	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.2	<0.20	<0.005	8.8	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.005	<0.0046	<0.0047	<0.0038
CELL-4-S	54"-60"	Toluene	(mg/g)	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.2	<0.20	<0.005	5.9	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.005	<0.0046	<0.0047	<0.0038
CELL-4-S	54"-60"	Xylenes	(mg/g)	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.2	<0.20	<0.005	<0.5	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.005	<0.014	<0.014	<0.011
CELL-4-S	54"-60"	Naphthalene	(mg/g)	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	<0.3	<0.30	<0.33	12	<0.3	<0.3	<0.3	<0.33	<0.3	<0.17	<0.170	<0.20	<0.21	<0.18
CELL-4-S	54"-60"	Phenanthrene	(mg/g)	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	<0.3	<0.30	<0.33	NA	<0.3	<0.3	<0.3	<0.33	<0.3	<0.17	<0.170	<0.20	<0.21	<0.18
CELL-4-S	54"-60"	Beryllium	(mg/g)	NR	0.2	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	54"-60"	Cadmium	(mg/g)	NR	< 0.1	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	54"-60"	Copper	(mg/g)	NR	1.3	NR	NR	NR	NR	NR	NR	<0.005	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	54"-60"	Vanadium	(mg/g)	NR	4	NR	NR	NR	NR	NR	NR	<0.005	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	54"-60"	Zinc	(mg/g)	NR	5.1	NR	NR	NR	NR	NR	NR	<0.005	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	54"-60"	Kjeldahl Nitrogen	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	<0.33	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	54"-60"	TOC	(mg/g)	440	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	54"-60"	Solids	% wt	NR	NR	NR	NR	NR	NR	NR	NR	88	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	54"-60"	pH	(stnd units)	8	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	54"-60"	Specific Conductar	(µmho/cm)	888	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	54"-60"	Moisture	(%)	NR	NR	NR	NR	NR	NR	NR	NR	<0.33	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR

NA - Not Analyzed, NR - Not Required

Table VI.D.1.A - 2
SITE H HISTORICAL SOIL-CORE SOIL ANALYSIS
Alon USA LP - Big Spring Refinery

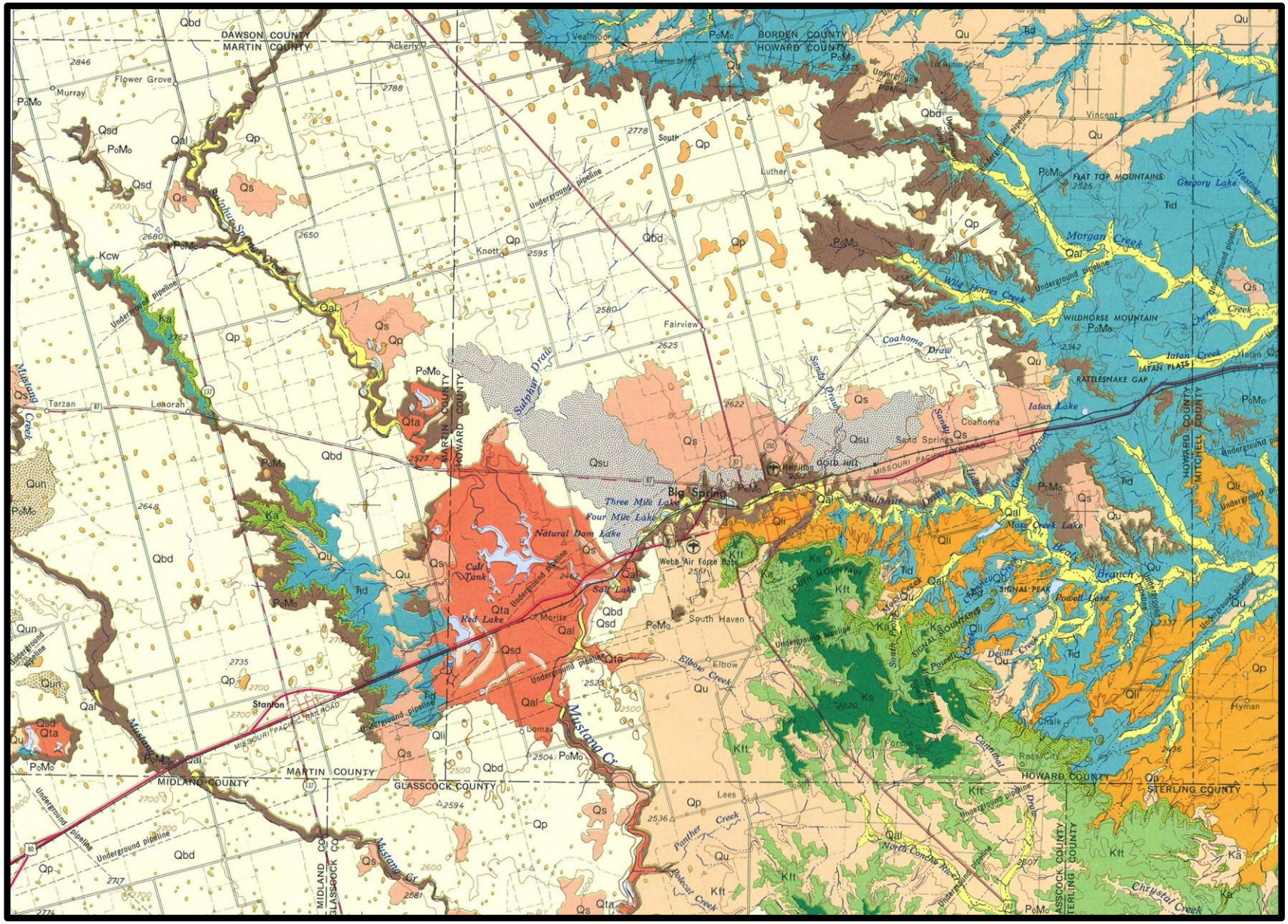
CELL #	Depth	Analyte	Standard	Jul-14	Jul-15	Jul-16	Jul-17	Jul-18	Jul-19	Jul-20	Jul-21	Jul-22	Jul-23
CELL-4-S	33"-54"	Arsenic	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	33"-54"	Chromium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	33"-54"	Lead	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	33"-54"	Nickel	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	33"-54"	Selenium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	33"-54"	Benzene	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	33"-54"	Toluene	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	33"-54"	Xylenes, totals	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	33"-54"	Naphthalene	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	33"-54"	Phenanthrene	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	33"-54"	Beryllium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	33"-54"	Cadmium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	33"-54"	Copper	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	33"-54"	Vanadium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	33"-54"	Zinc	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	33"-54"	Kjeldahl Nitrogen	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	33"-54"	TOC	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	33"-54"	Solids	% wt	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	33"-54"	pH	(stnd units)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	33"-54"	Specific Conductar	(µmho/cm)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	33"-54"	Moisture	(%)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	54"-60"	Arsenic	(mg/g)	2.3	2.8	2.8	3.5	3.6	2.7	3.3	3	2.7	2.4
CELL-4-S	54"-60"	Chromium	(mg/g)	12.6	16.9	14.4	17.6	19.5	11.9	18.1	16.4	14.1	13.8
CELL-4-S	54"-60"	Lead [total]	(mg/g)	7.7	9.1	12.6	11.9	12.8	8.6	11.1	11.7	10.8	8.7
CELL-4-S	54"-60"	Nickel	(mg/g)	10	16	16.5	16.8	20.9	18.3	18.3	13.2	11.8	12.3
CELL-4-S	54"-60"	Selenium	(mg/g)	0.36	0.27 J	<1.1	1.2J	<2.7	2.5 J	<2.3	4.1	1.7	1.60 J
CELL-4-S	54"-60"	Benzene	(mg/g)	<0.0044	<0.00067	<0.0033	<0.0015	<0.0012	<0.0003	<0.00049	<0.0031	<0.00021	0.00084
CELL-4-S	54"-60"	Toluene	(mg/g)	<0.0044	<0.0010	<0.0033	<0.0017	<0.0012	0.0036	<0.0039	<0.0031	<0.00019	0.00049 J
CELL-4-S	54"-60"	Xylenes	(mg/g)	<0.013	<0.0028	<0.0098	<0.002	<0.0012	<0.0011	<0.0039	<0.0031	<0.0012	<0.0011
CELL-4-S	54"-60"	Naphthalene	(mg/g)	<0.18	<0.030	<0.028	<0.024	<0.023	<0.046	<0.18	<0.024	<0.0054	<0.0051
CELL-4-S	54"-60"	Phenanthrene	(mg/g)	<0.18	<0.042	<0.039	<0.025	<0.024	<0.047	<0.18	<0.024	<0.0014	<0.0013
CELL-4-S	54"-60"	Beryllium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	54"-60"	Cadmium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	54"-60"	Copper	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	54"-60"	Vanadium	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	54"-60"	Zinc	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	54"-60"	Kjeldahl Nitrogen	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	54"-60"	TOC	(mg/g)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	54"-60"	Solids	% wt	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	54"-60"	pH	(stnd units)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	54"-60"	Specific Conductar	(µmho/cm)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
CELL-4-S	54"-60"	Moisture	(%)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR

NA - Not Analyzed, NR - Not Required

FIGURES

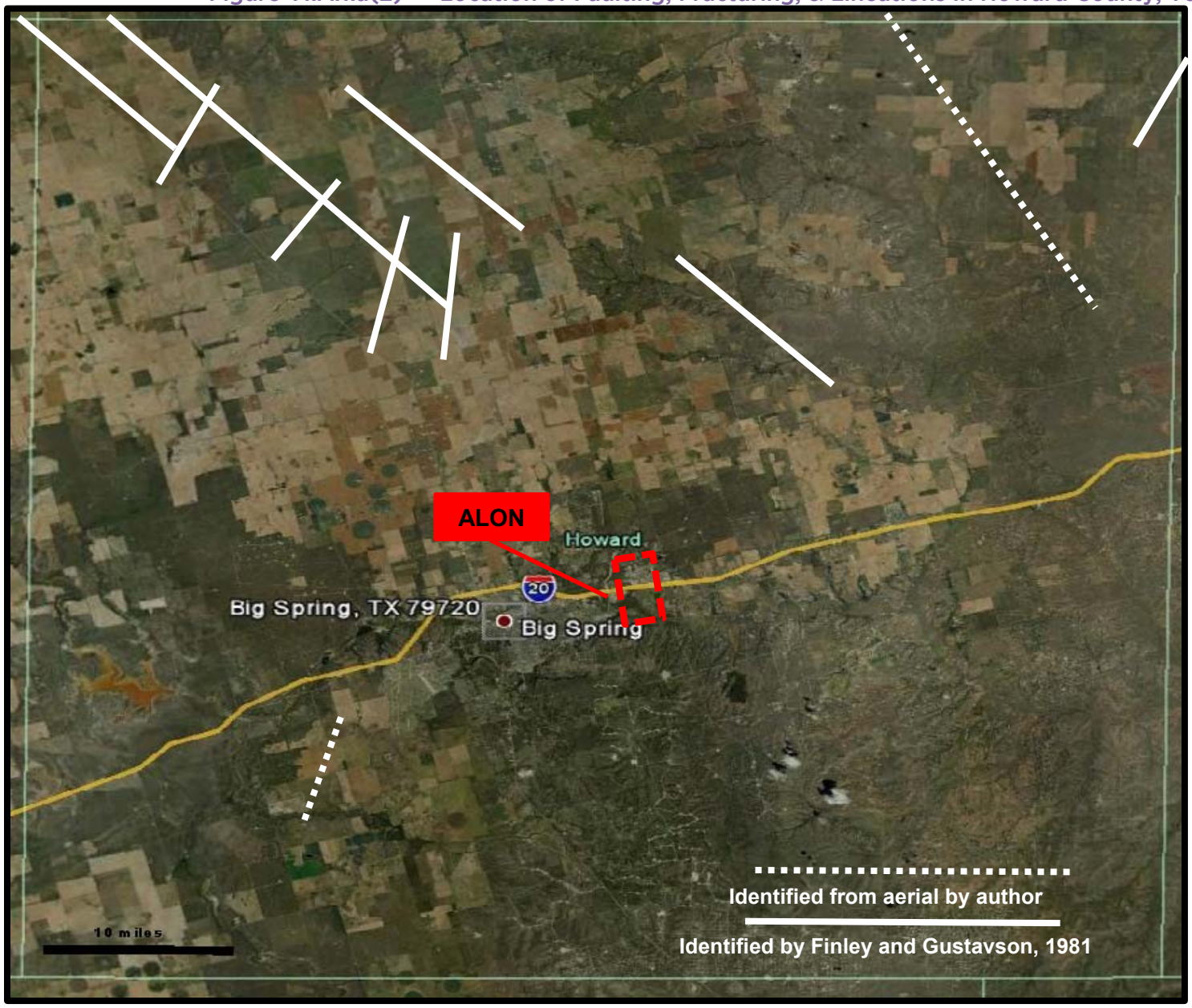
I.D.	Title
VI.A.1a(1)	Regional Geology – Sig Spring, Texas (*2 Sheets*)
VI.A.1a(2)	Location of Faulting, Fracturing, & Lineations in Howard County (*1 Sheet*)
VI.A.1a(3)	Structural Cross-Sections E-E, U2 – U3 (*8 Sheets*)
VI.A.1a(4)	Regional Statigraphic Column - Big Spring, TX
VI.A.1a(7)-1	Potentiometric Map & LNAPL Thickness – July 2020 (*1 Sheet)*
VI.A.1a(7)-2	Potentiometric Maps & LNAPL Thickness – July 2021 (*1 Sheet*)
VI.A.1a(7)-3	Potentiometric Maps & LNAPL Thickness – July 2022 (*1 Sheet*)
VI.A.1a(7)-4	Bouguer Gravity Map of Sig Spring Area (*1 Sheet*)
VI.A.1.c	Topographic Map with Erosion Areas Designated (*1 Sheet*)
VI.A.4.b	Cross-Sections of Waste Units (*14 Sheets*)
VI.A.4.e	Map of Soil Types – Big Spring Refinery (*1 Sheet*)
VI.B.1.f	Regional Potentiometric Map of Ogallala Aquifer (*1 Sheet*)
VI.B.1.i	Regional Ogallala Aquifer Recharge Areas (*1 Sheet*)
VI.B.2.c-1	Isocontour Map of Top of Ogallala FM Basal Gravel Unit (*1 Sheet*)
VI.B.2.c-2	Isocontour Map of Top of Dockum FM Red-Bed Clay (*1 Sheet*)
VI.B.2.d	Potentiometric Map of Water Levels and Net-Thickness Map of LNAPL – July 2023 (*1 Sheet*)
VI.B.3.e	Map of Facility Monitoring Information (*8 Sheets*)

Figure VI.A.1.a(1)_Sheet 1 of 2 Regional Geology – Big Spring, Texas



Source: Bureau of Economic Geology, Geologic Atlas of Texas, Big Spring Sheet

Figure VI.A.1.a(2) Location of Faulting, Fracturing, & Lineations in Howard County, Texas



Source: Bureau of Economic Geology, Geologic Atlas of Texas, Big Spring Sheet

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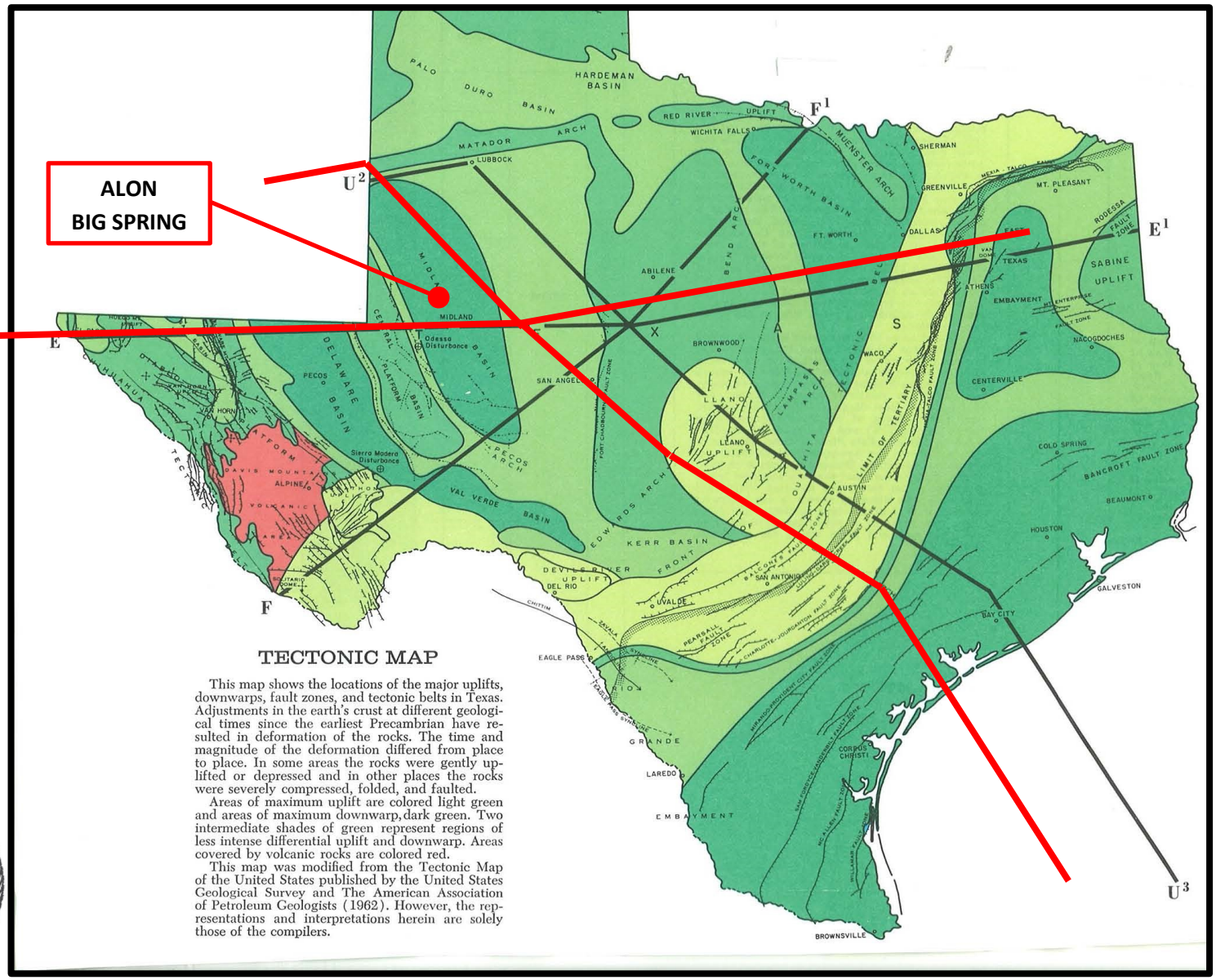
Figure VI.A.1.a(3) Sheet 1 of 8 Structural Cross-Sections E-E[1], U[2] – U[3]



Source: Geologic Highway Map of Texas, AIPG

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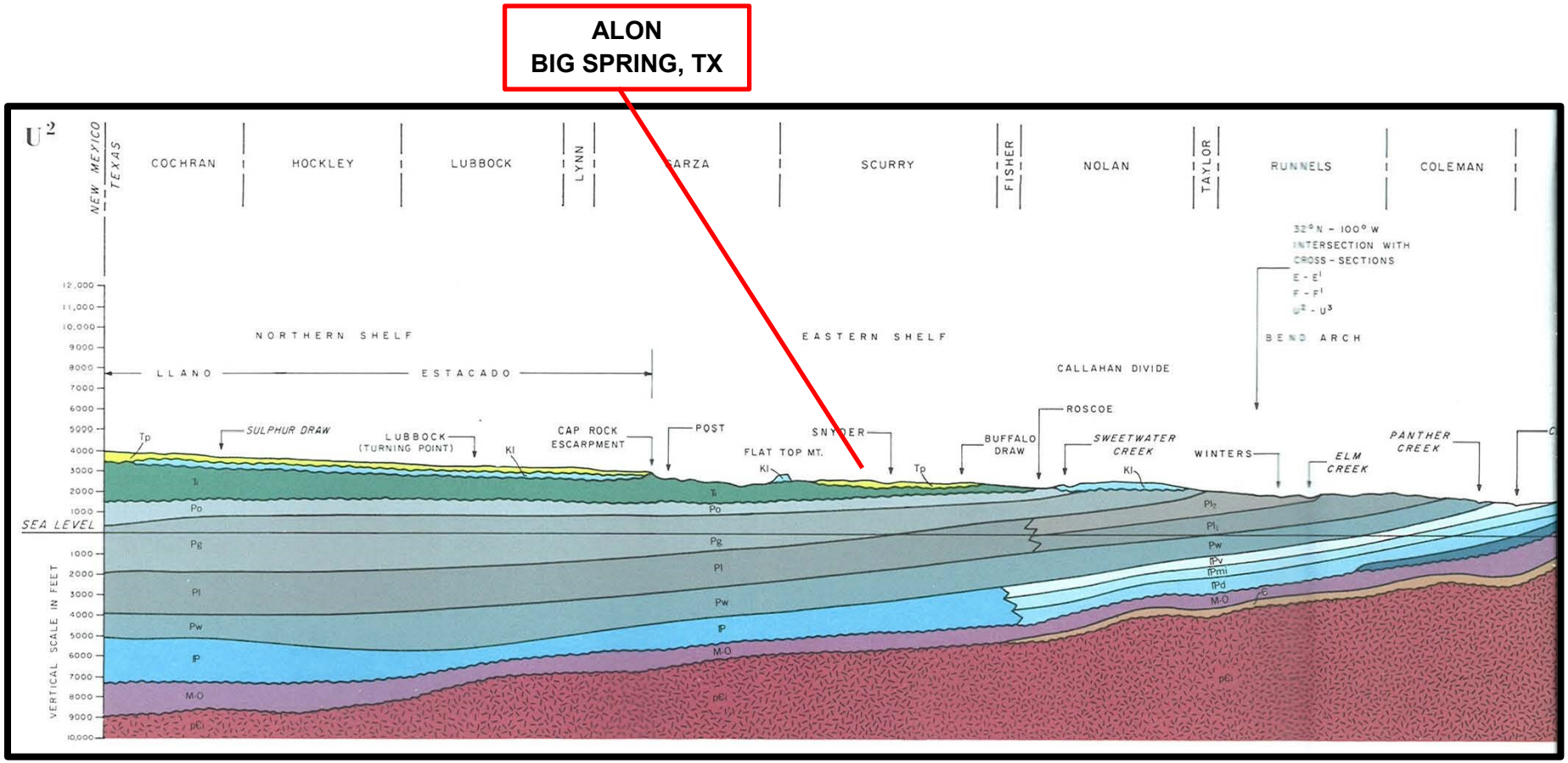
Figure VI.A.1.a(3)_Sheet 2 of 8 Structural Cross-Section U^2 – U^3



Source: Geologic Highway Map of Texas, AIPG

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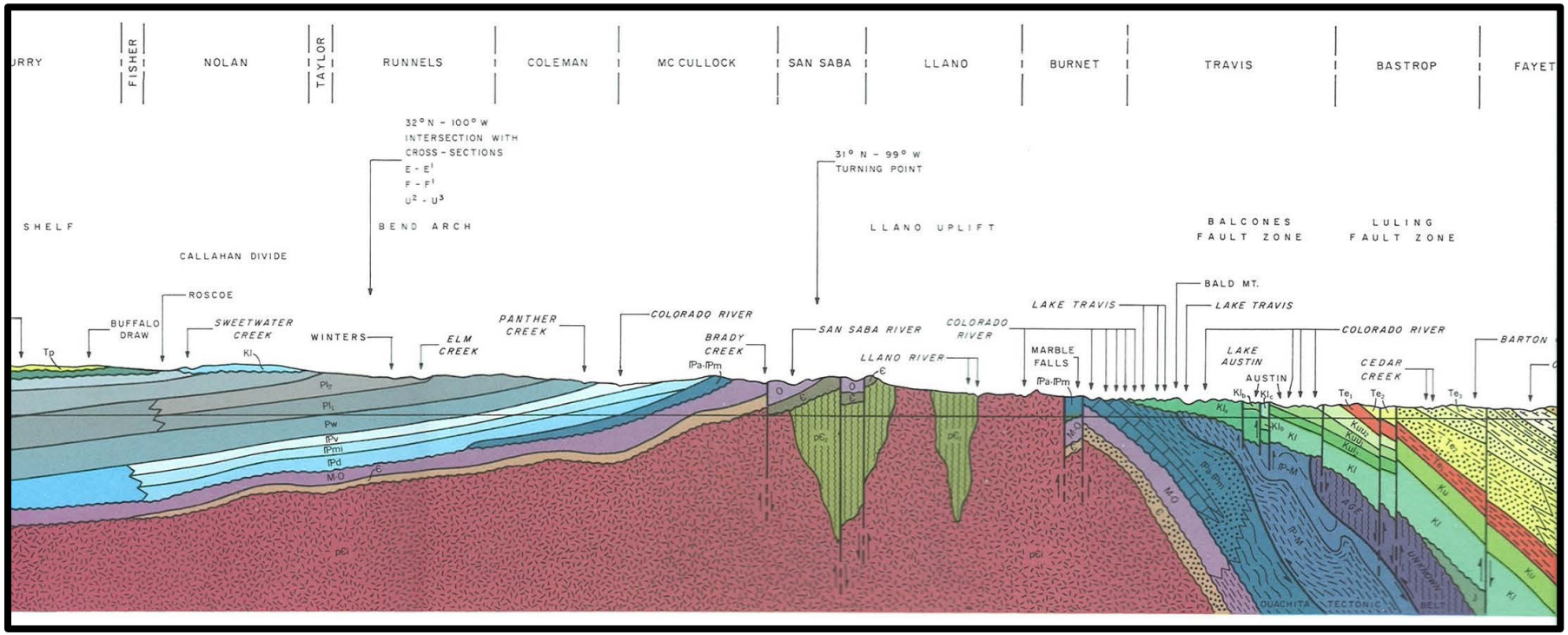
Figure VI.A.1.a(3)_Sheet 3 of 8 Structural Cross-Section $U^2 - U^3$



Source: Geologic Highway Map of Texas, AIPG

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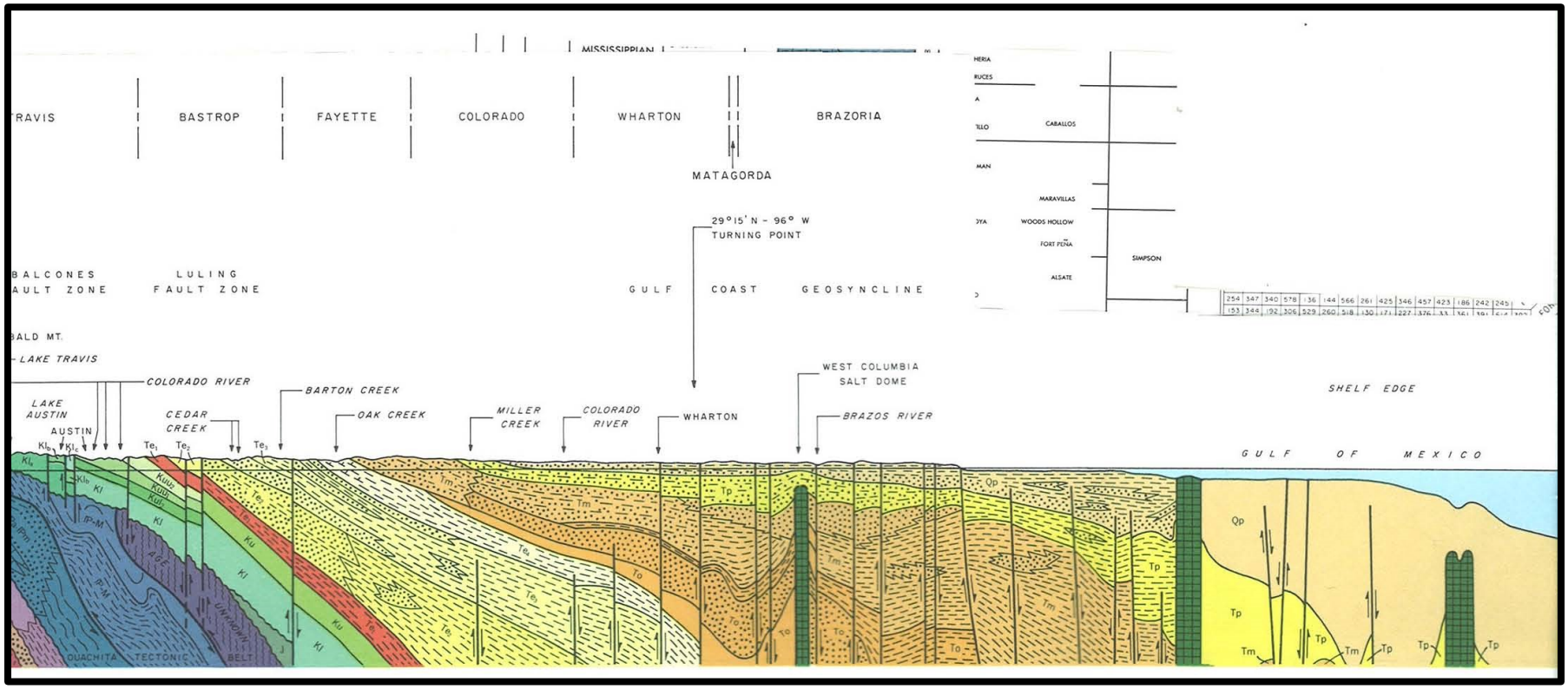
Figure VI.A.1.a(3)_Sheet 4 of 8 Structural Cross-Section U^2 – U^3



Source: Geologic Highway Map of Texas, AIPG

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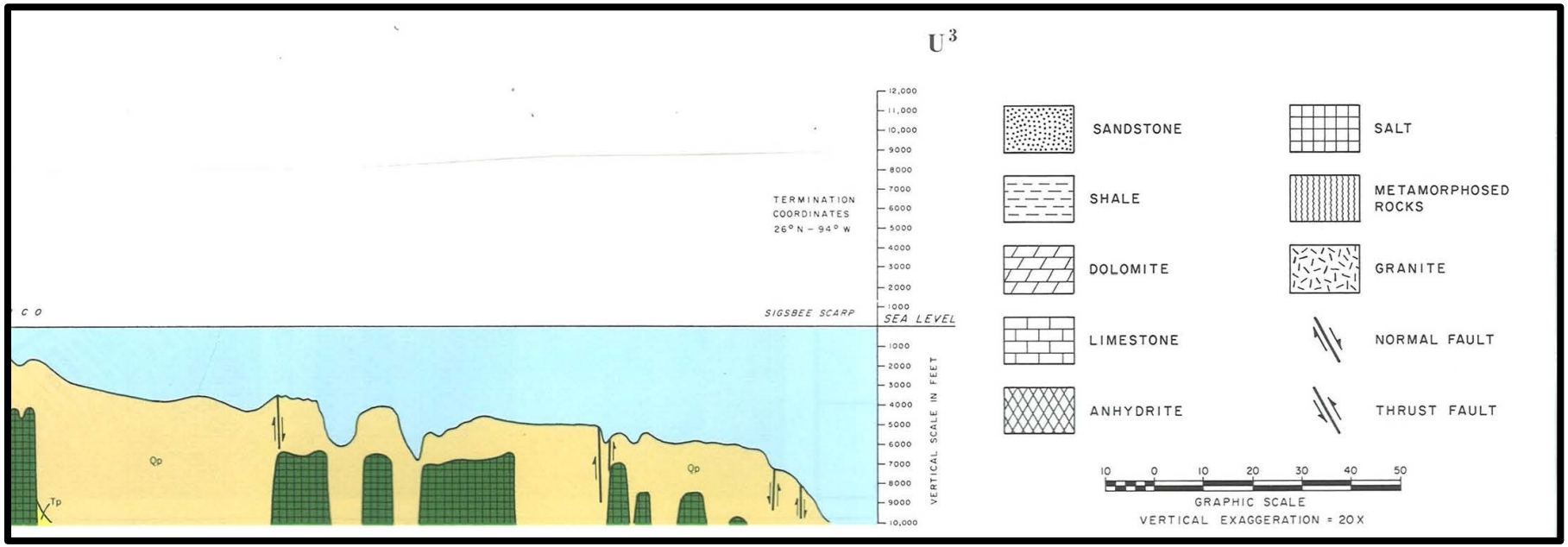
Figure VI.A.1.a(3)_Sheet 5 of 8 Structural Cross-Section U^2 – U^3



Source: Geologic Highway Map of Texas, AIPG

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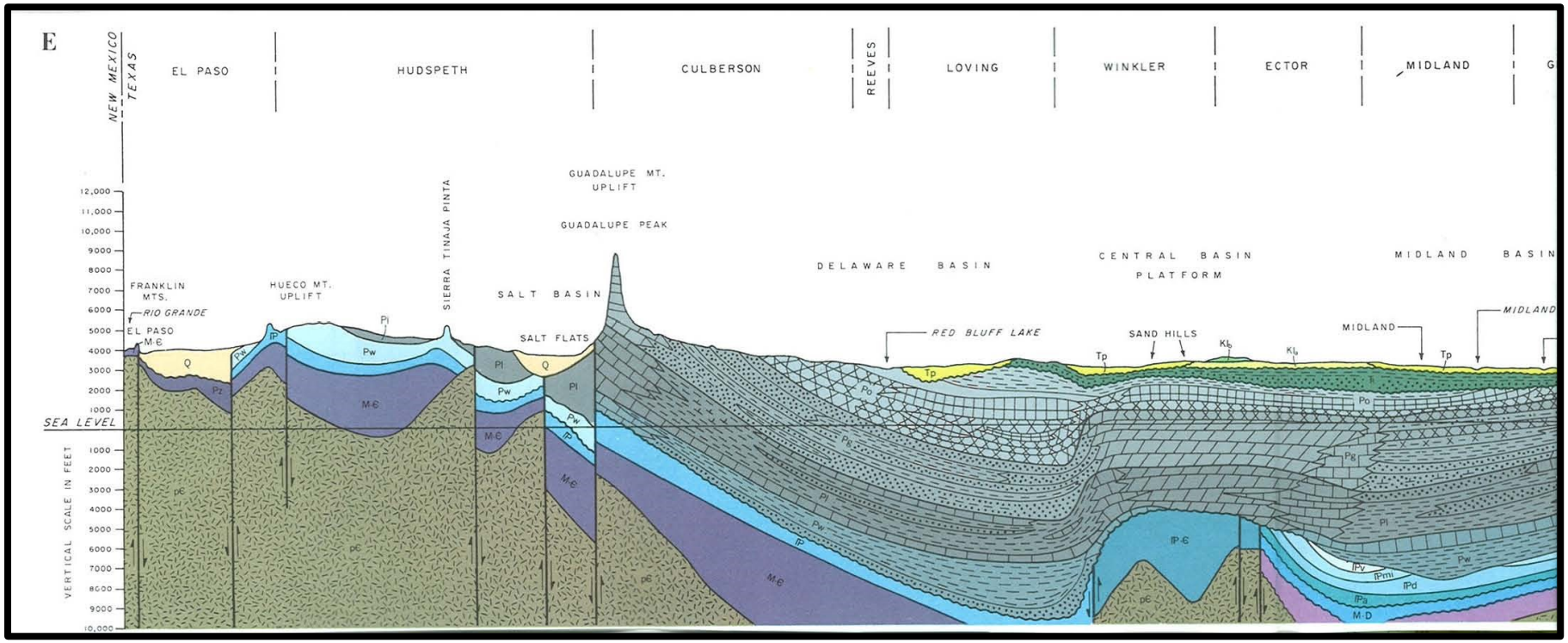
Figure VI.A.1.a(3)_Sheet 6 of 8 Structural Cross-Section E – E[1]



Source: Geologic Highway Map of Texas, AIPG

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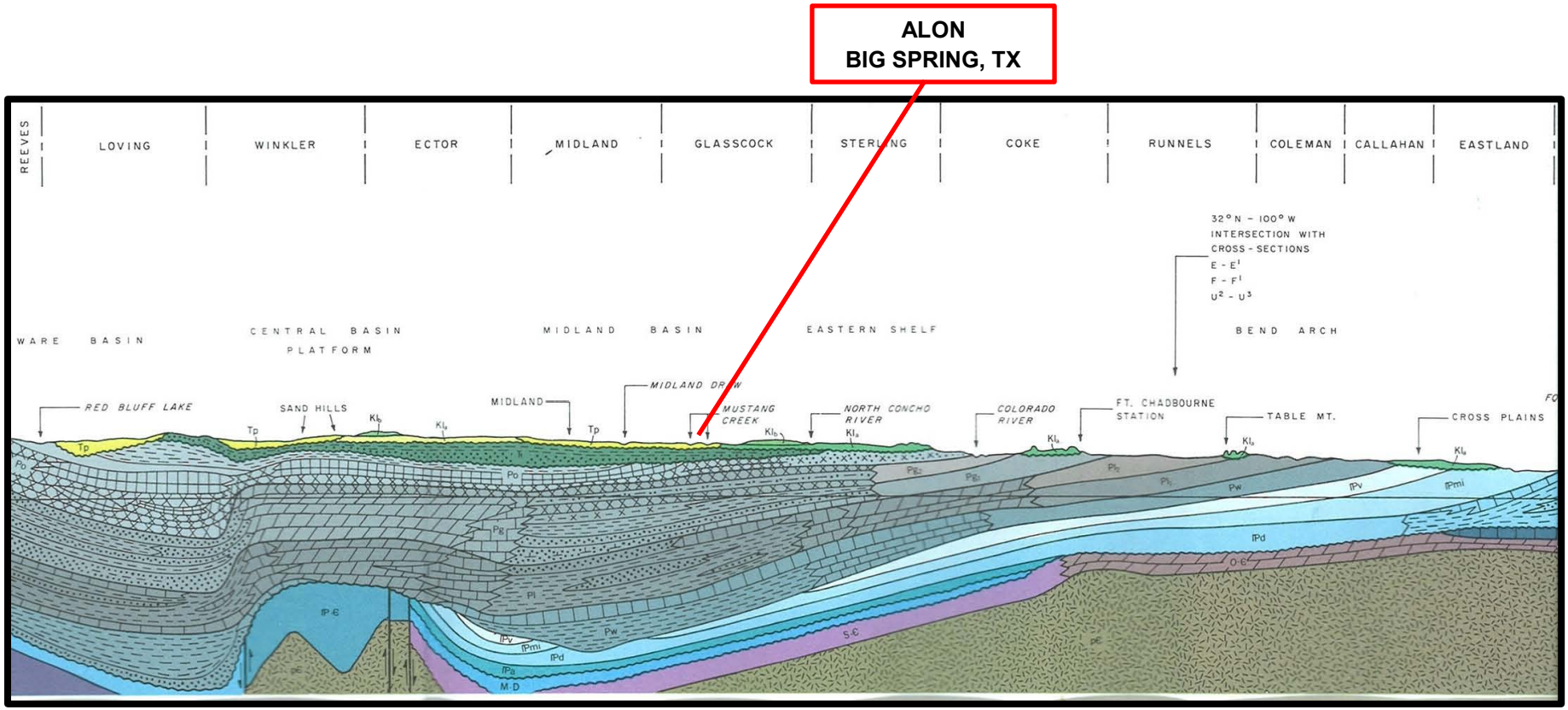
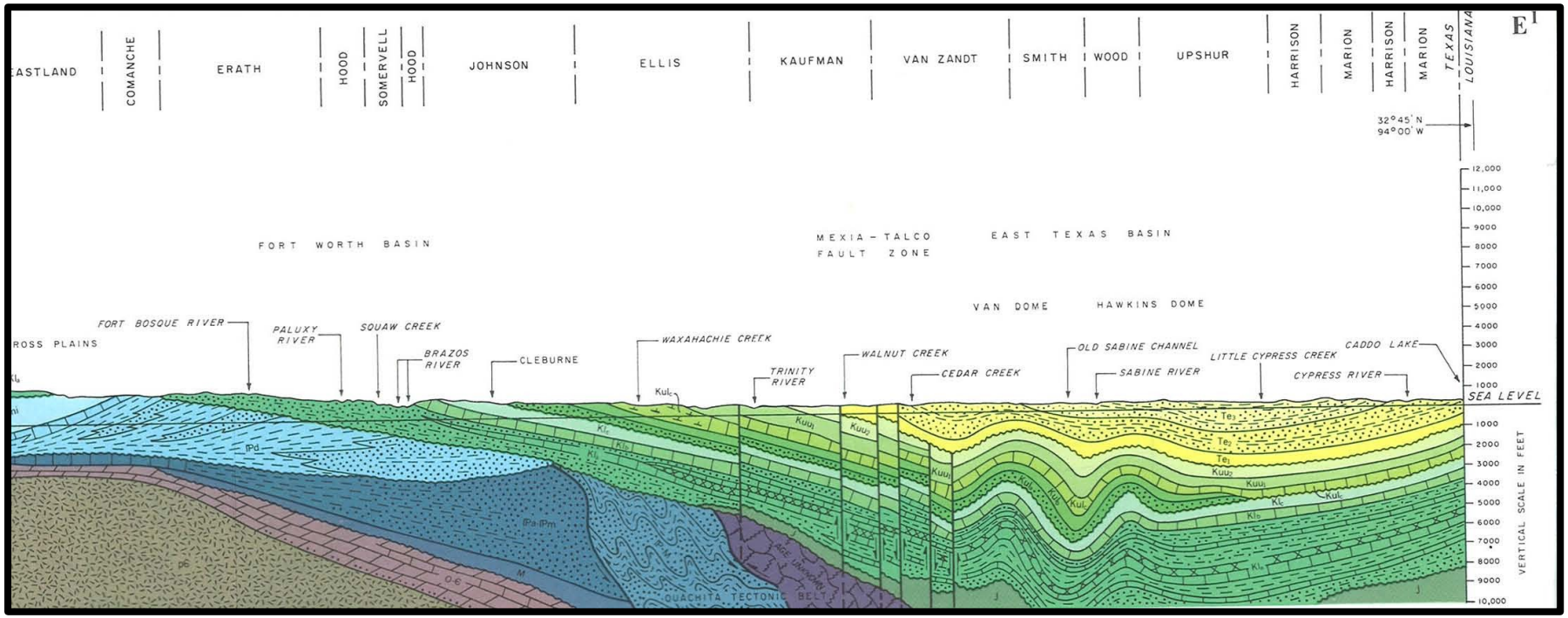
Figure VI.A.1.a(3)_Sheet 7 of 8 Structural Cross-Section E – E[1]



Source: Geologic Highway Map of Texas, AIPG

Figure VI.A.1.a(3)_Sheet 8 of 8 Structural Cross-Section E – E[1]



Source: Geologic Highway Map of Texas, AIPG

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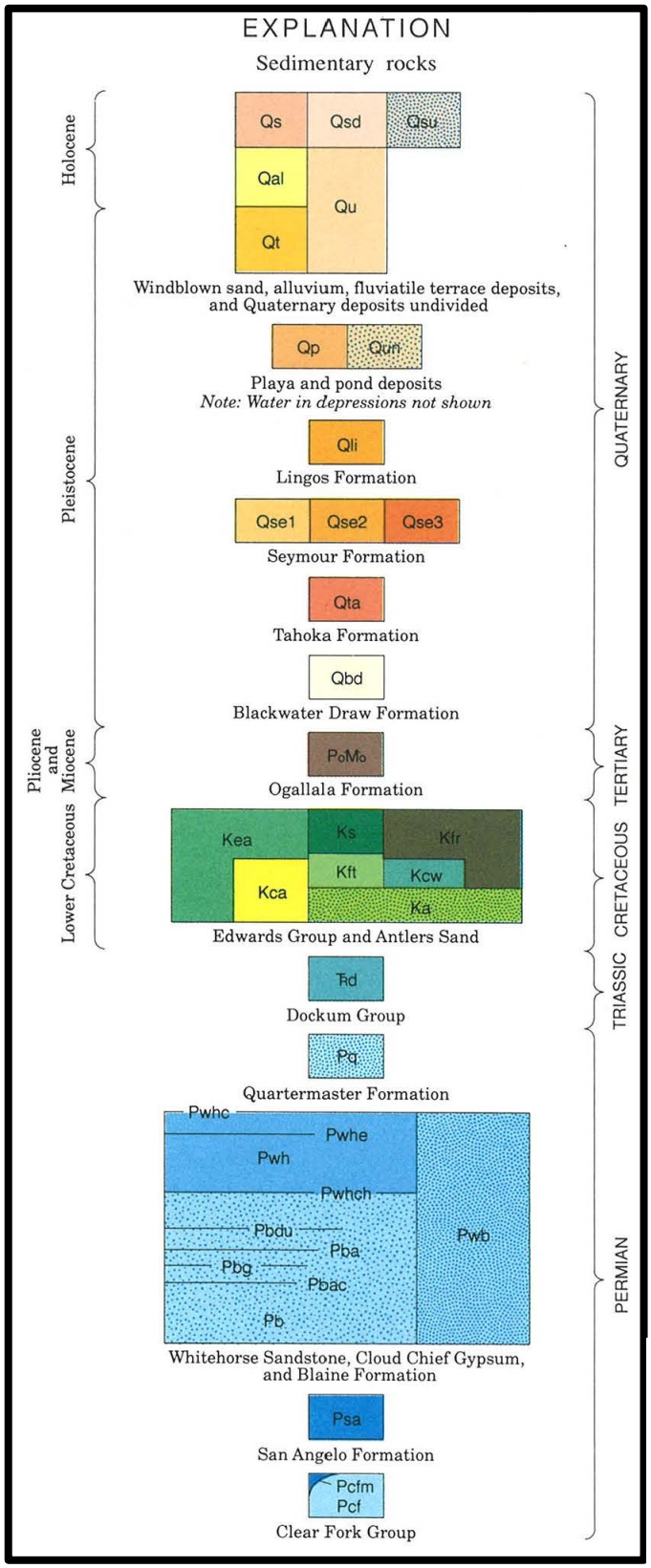
Figure VI.A.1.a(4) Regional Stratigraphic Column – Big Spring, Texas



Source: Bureau of Economic Geology, Geologic Atlas of Texas, Big Spring Sheet

Figure VI.A.1.a(7)-1 Potentiometric Map & LNAPL Thickness – July 2020

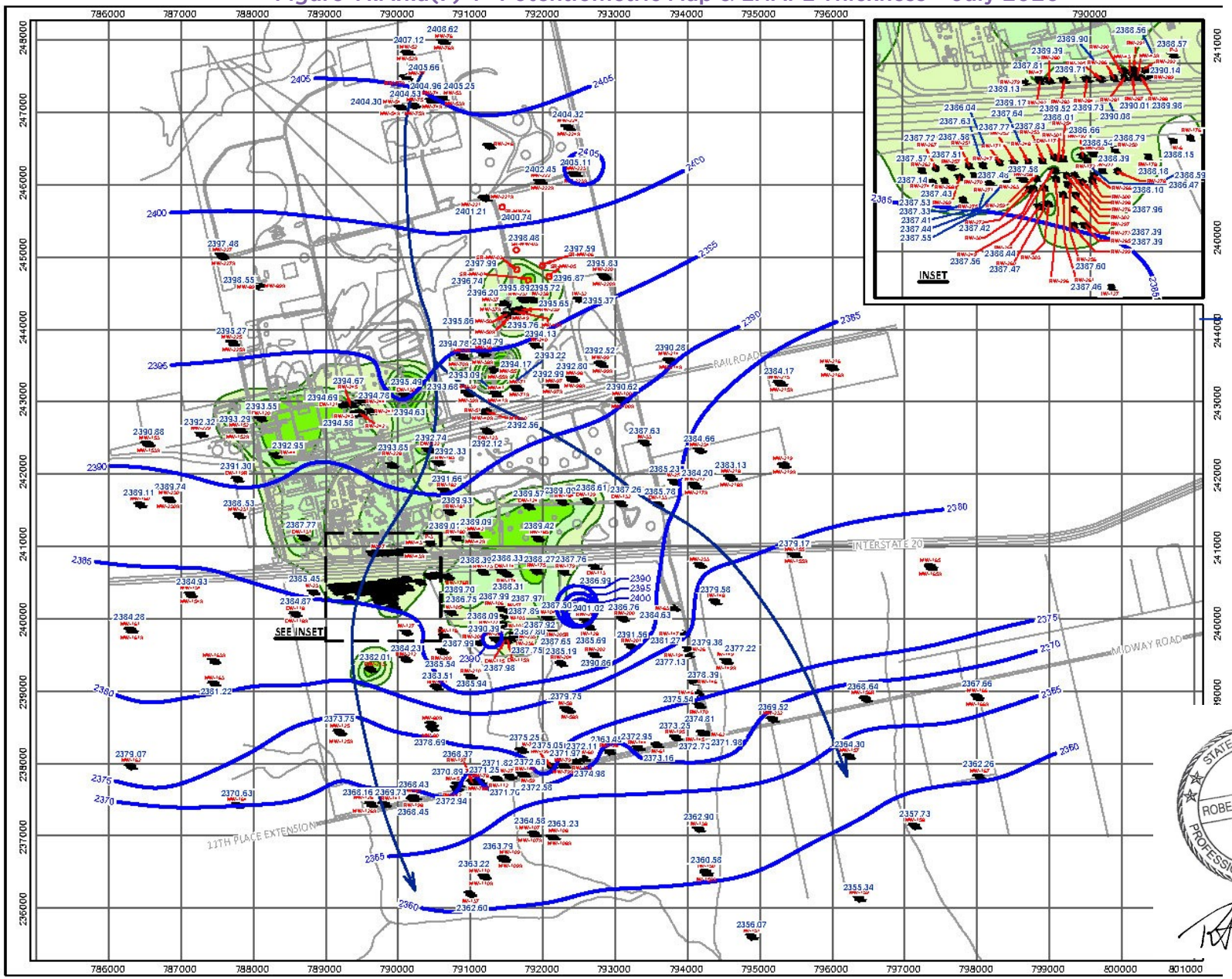


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Figure VI.A.1.a(7)-2 Potentiometric Map & LNAPL Thickness – July 2021

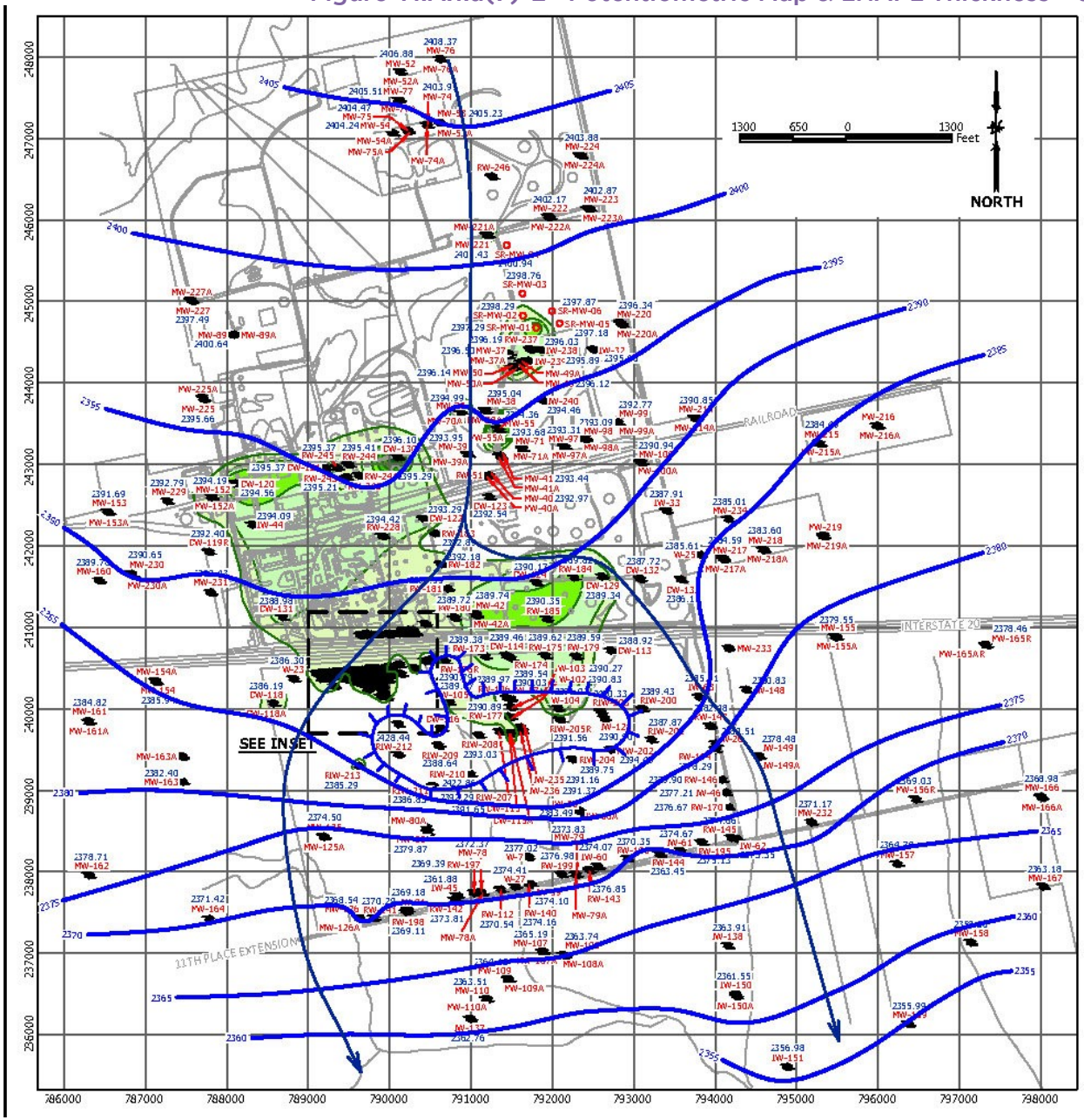
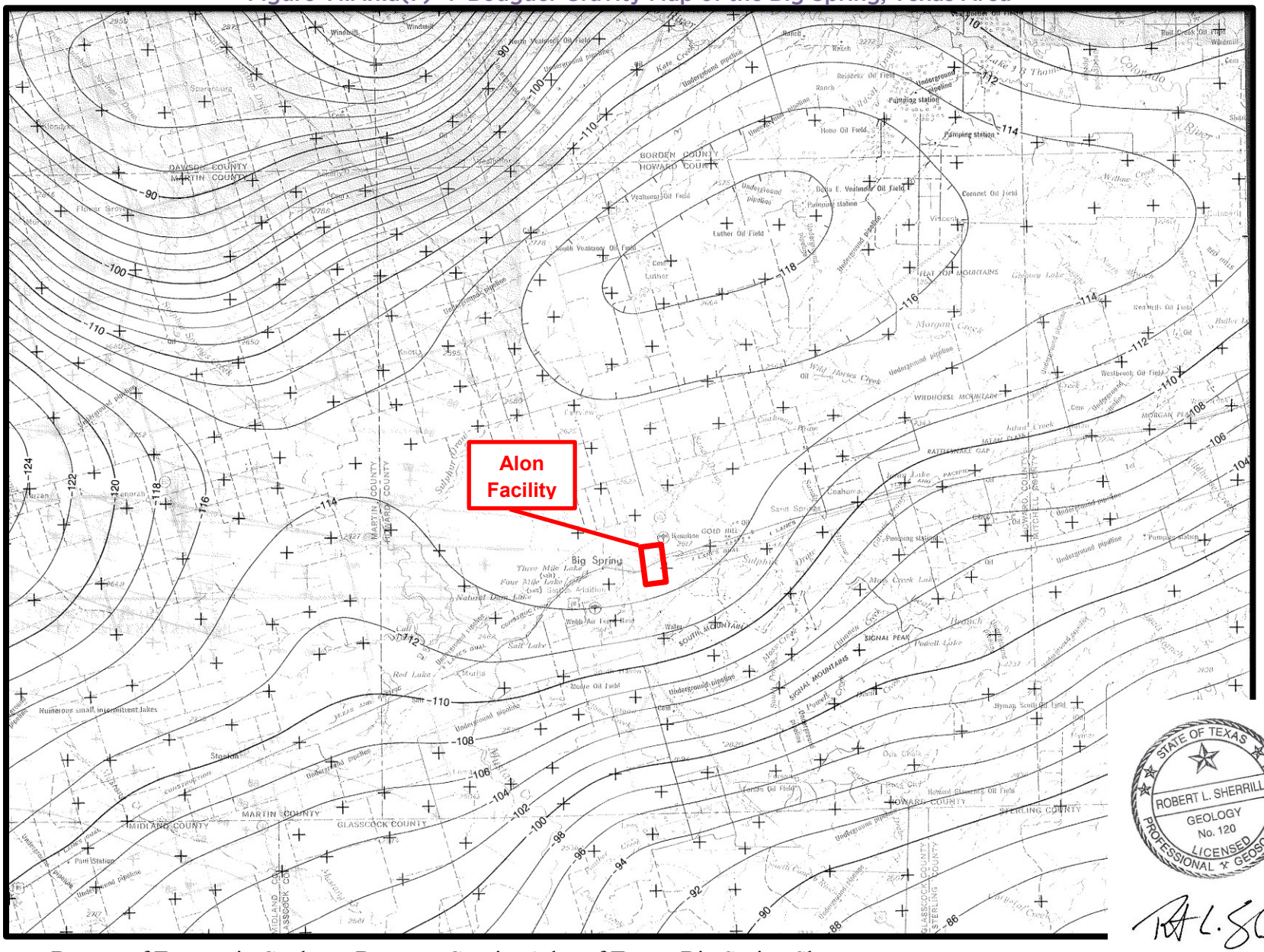


Figure VI.A.1.a(7)-4 Bouguer Gravity Map of the Big Spring, Texas Area



Source: Bureau of Economic Geology, Bouguer Gravity Atlas of Texas, Big Spring Sheet

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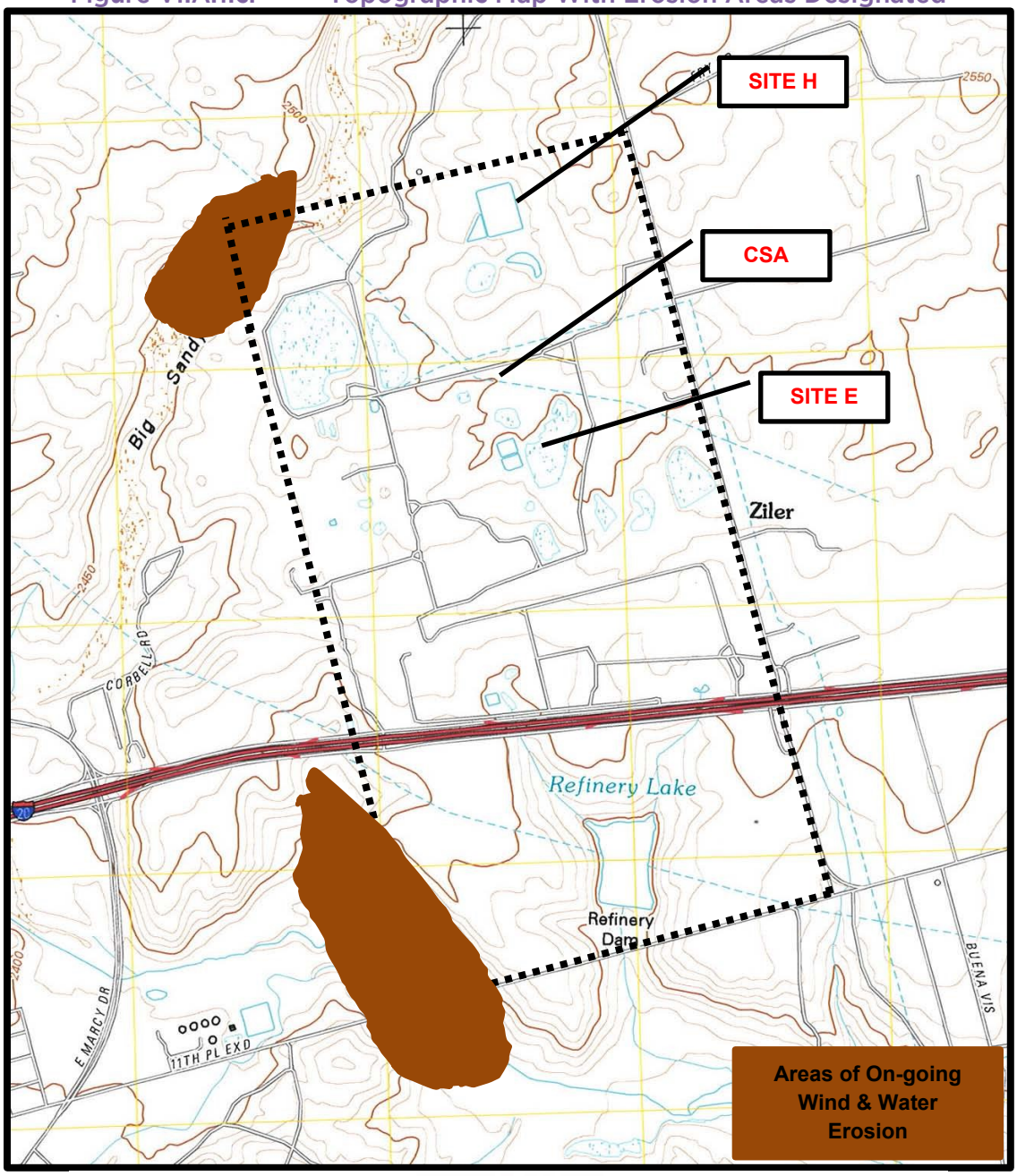
Figure VI.A.1.c. Topographic Map With Erosion Areas Designated



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FEET

CONTOUR INTERVAL 10 FEET

This map was produced to conform with version 0.5.10 of the draft USGS Standards for 7.5-Minute Quadrangle Maps. A metadata file associated with this product is also draft version 0.5.10

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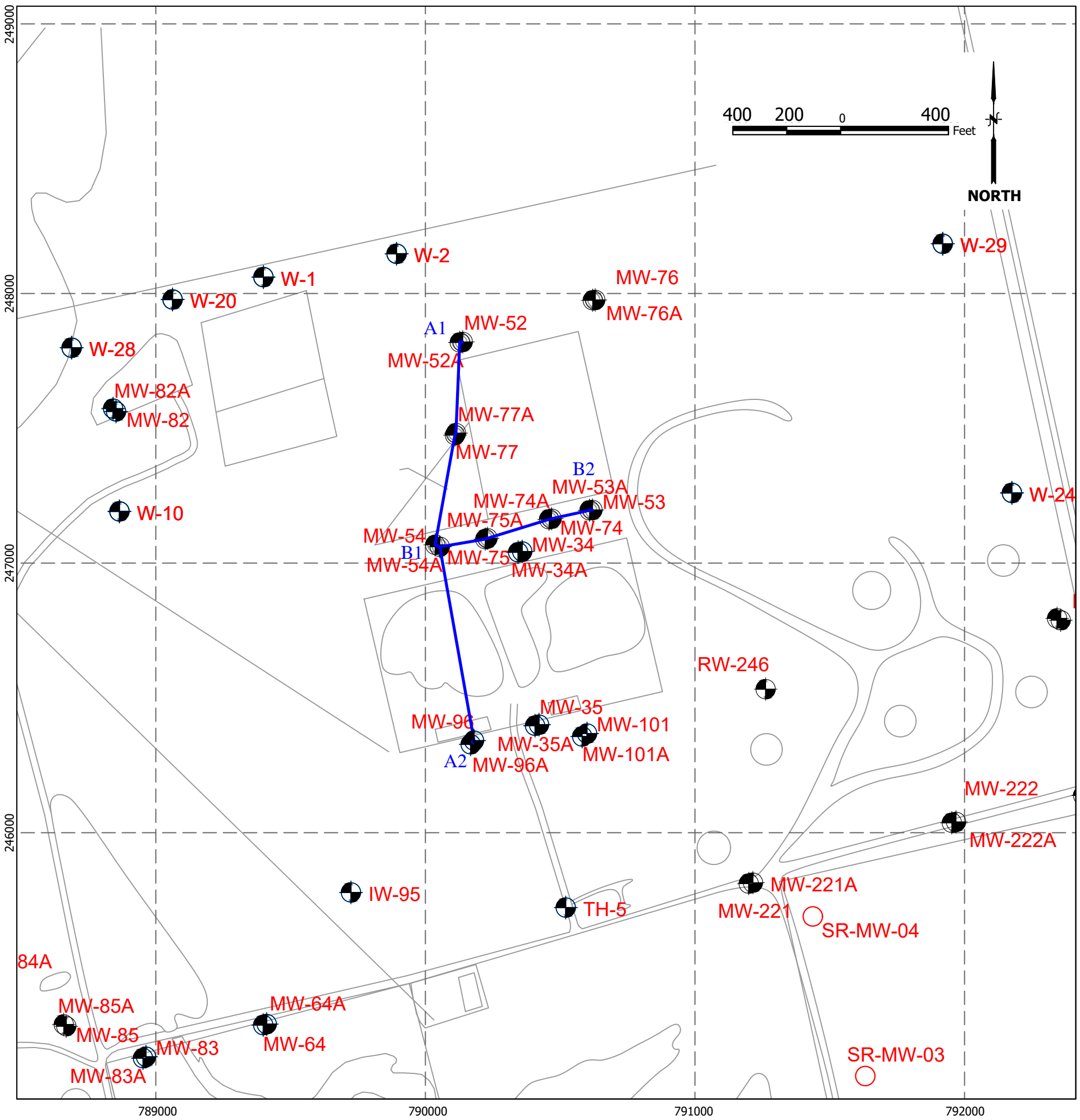
Source: US Geological Survey Big

Lines of Cross-Sections - Site H LTU Unit

Figure VI.A.4.b [Sheet 1 of 13]



LEGEND

- Well Location
- Sid Richardson Well
- X—X Line Of Cross Sections

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ATLAS

Alon USA: Big Spring, Texas Refinery

Figure VI.A.4.b [Sheet 1 of 13]

File Name: BSPRG 2023 X-SEC MAP.dwg Drawn by: CAD2U / Approved by: RLS / Project # 3270*1*328***

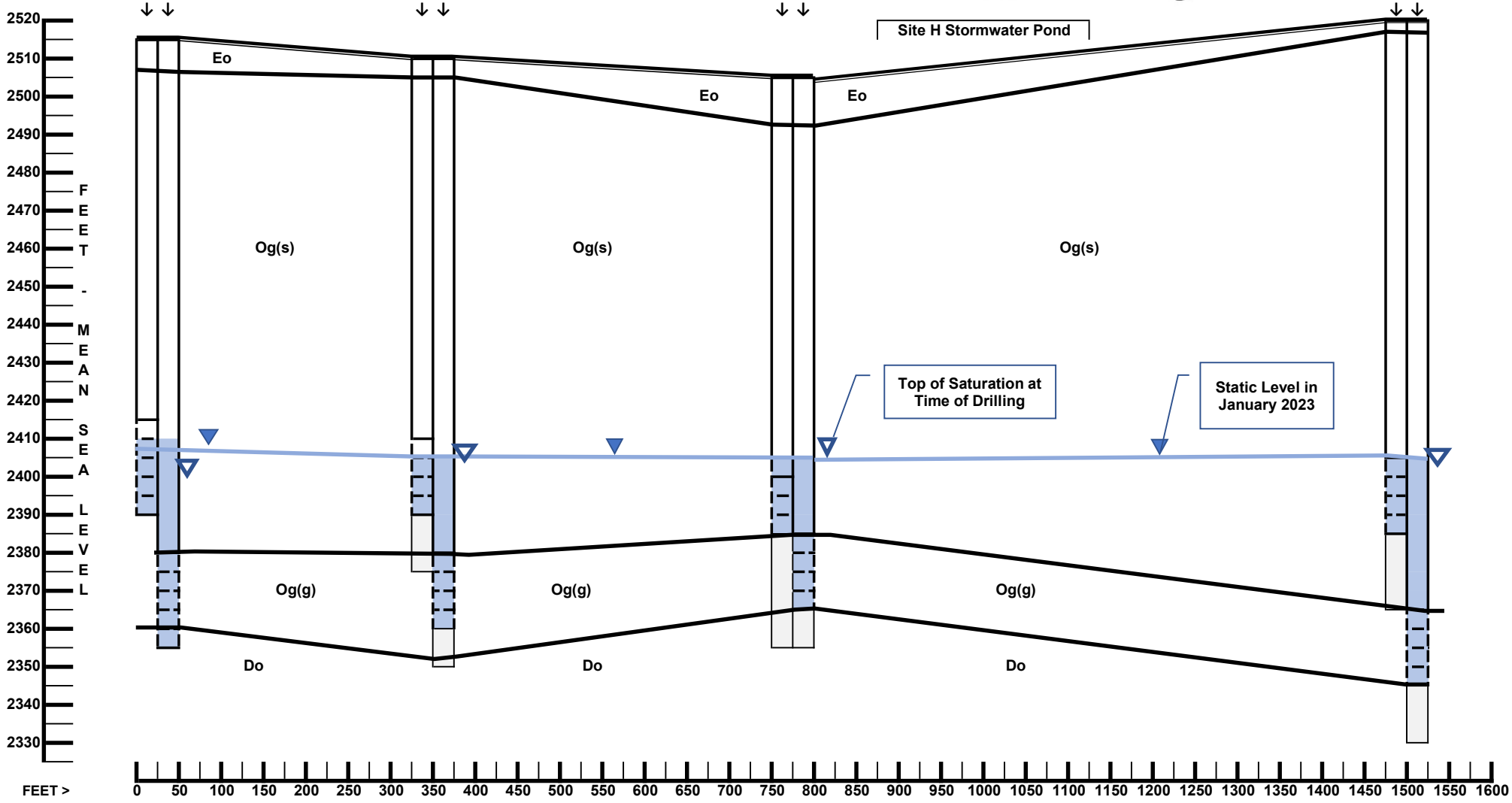
Rev. 1 07/15/2025 pg. 618

Figure VI.A.4.b.

North (A1) to South (A2) Cross-Section - Site H SWMU

Sheet 2 of 13

	A1 (North)						A2 (South)	
Well	MW-52	MW-52A	MW-77	MW-77A	MW-54	MW-54A	MW-96	MW-96A
Northing	247,820	247,818	247,474	247,482	247,068	247,060	246,341	246,328
Easting	790,138	790,127	790,109	790,113	790,036	790,053	790,180	790,168
Top Casing	2517.86	2517.82	2511.59	2511.86	2506.96	2507.27	2523.25	2522.84
Top Grade	2515.1	2515.1	2508.77	2508.99	2505.16	2505.31	2520.34	2519.94
Date Drilled	MAR-1989	MAR-1989	JUN-1992	JUN-1989	MAR-1989	MAR-1989	Sep-92	Sep-92
Top Satur,	2400.08	2400.08	2407.99	2407.99	2403.31	2407.31	2405.11	2405.11
LNAPL	none	none	none	none	none	none	none	none



Eo - Eolian Windblown Silt & Very Fine Sand
Og(s) - Ogallala Formation Upper Fine Sand Unit
Og(g) - Ogallala Formation Lower Basal Gravel Unit
Do - Dockum Formation Red Bed Clay

Well Casing | Well Screen | Tail-Hole (Plugged)

Revision No. 1, Revision Date Oct-04-2024

Figure VI.A.4.b.

West (B1) to East (B2) Cross-Section - Site H SWMU

Sheet 3 of 13

B1 (West)

Well	MW-54	MW-54A	MW-75	MW-75A	MW-74	MW-74A	MW-53	MW-53A
Northing	MW-54	MW-54A	MW-75	MW-75A	247,165	247,162	MW-53	MW-53A
Easting	247,068	247,060	247,089	247,092	790,468	790,459	247,197	247,196
Top Casing	790035.88	790053.31	790222.09	790230.16	2509.55	2509.54	790619.61	790608.46
Top Grade	2506.96	2507.27	2508.38	2508.38	2506.61	2506.54	2511.27	2511.12
Date Drilled	Nov-06	Nov-06	Nov-06	Nov-06	Jun-92	Jun-92	Nov-06	Nov-06
Top Satur,	Mar-89	Mar-89	Jun-92	Jun-92	Jun-92	Jun-92	Mar-89	Mar-89
LNAPL	none	none	none	none	none	none	2411.99	2411.99

B2 (East)

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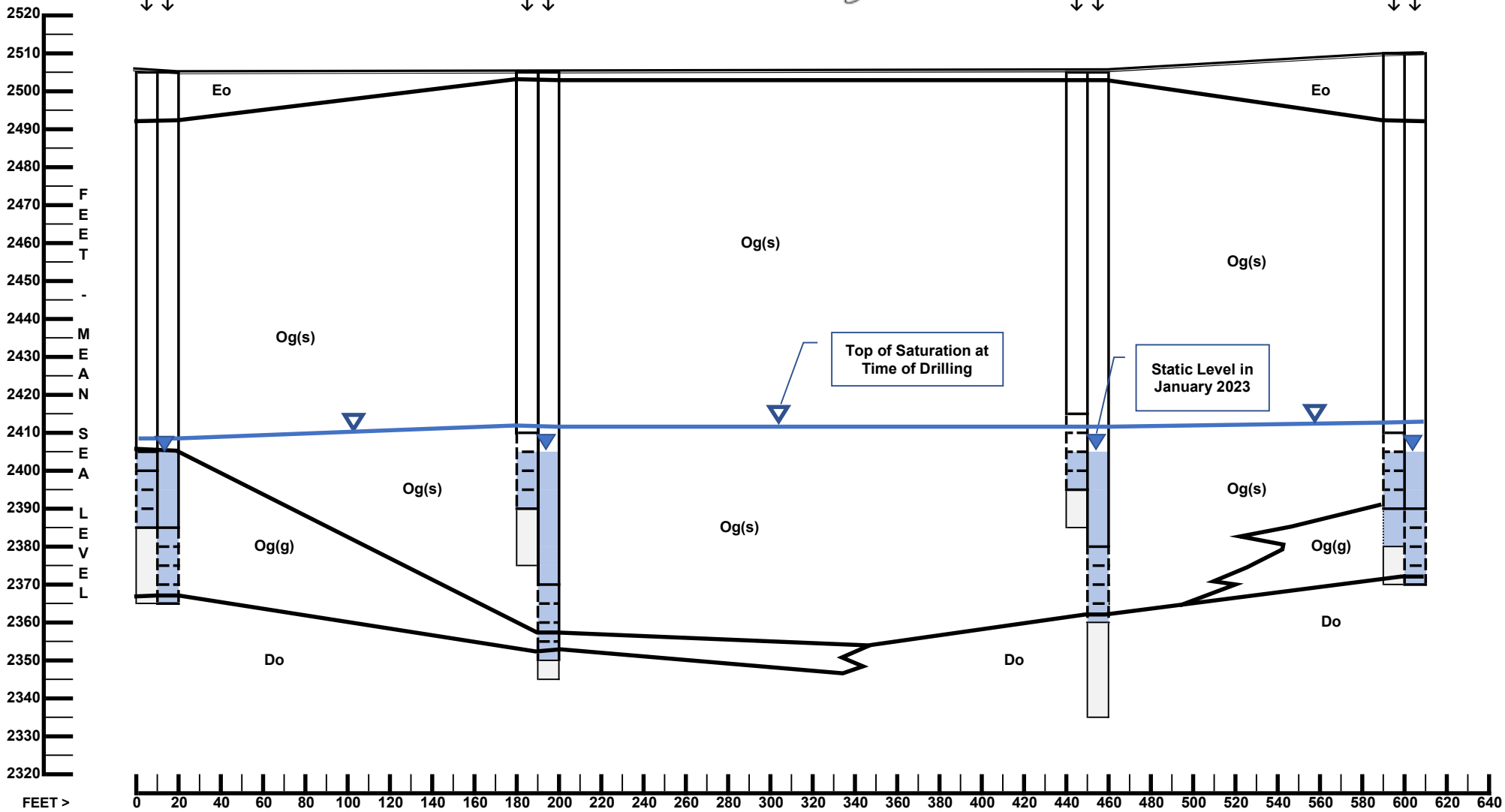


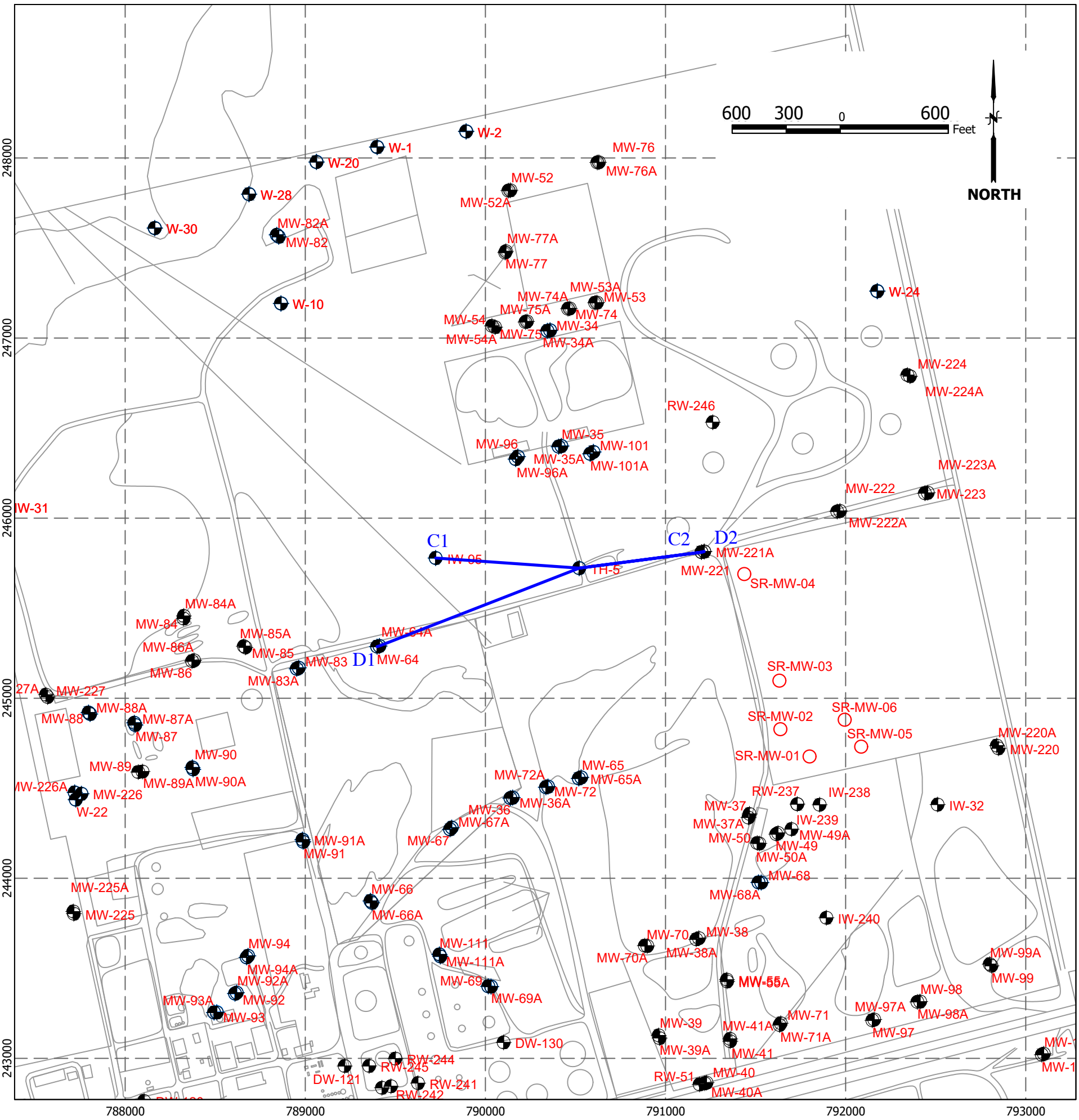
Eo - Eolian Windblown Silt & Very Fine Sand
Og(s) - Ogallala Formation Upper Fine Sand Unit
Og(g) - Ogallala Formation Lower Basal Gravel Unit
Do - Dockum Formation Red Bed Clay

Well Casing | Well Screen | Tail-Hole (Plugged)

Revision No. 1, Revision Date Oct-04-2024

Lines of Cross-Sections - CSA Unit

Figure VI.A.4.b [Sheet 4 of 13]



LEGEND

- Well Location
- Sid Richardson Well
- X—X Line Of Cross Sections

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Robert L. Sherrill, P.G.

Revision No. 1, Revision Date Oct-04-2024

Alon USA Big Spring, Refinery

Figure VI.A.4.b [Sheet 4 of 13]

File Name: BSPRG 2023 X-SEC MAP.dwg Drawn by: CAD2U / Approved by: RLS / Project # s270*1*328***

Figure VI.A.4.b.

North (C1) to South (C2) Cross-Section - Container Storage Area

Sheet 5 of 13

	C1 (North)		C2 (South)	
Well	IW-95	TH-5	MW-221	MW-221A
Northing	245,778	245,722	245,811	245,815
Easting	789,724	790,520	791,199	791,215
Top Casing	2505.16	2505.5	2512.68	2512.56
Top Grade	2502.15	2501.71	2509.49	2509.43
Date Drilled	Oct-92	Nov-78	Oct-97	Oct-97
Top Satur,	2412.32	NR	2394.43	2394.43
LNAPL	none	none	0.03	none

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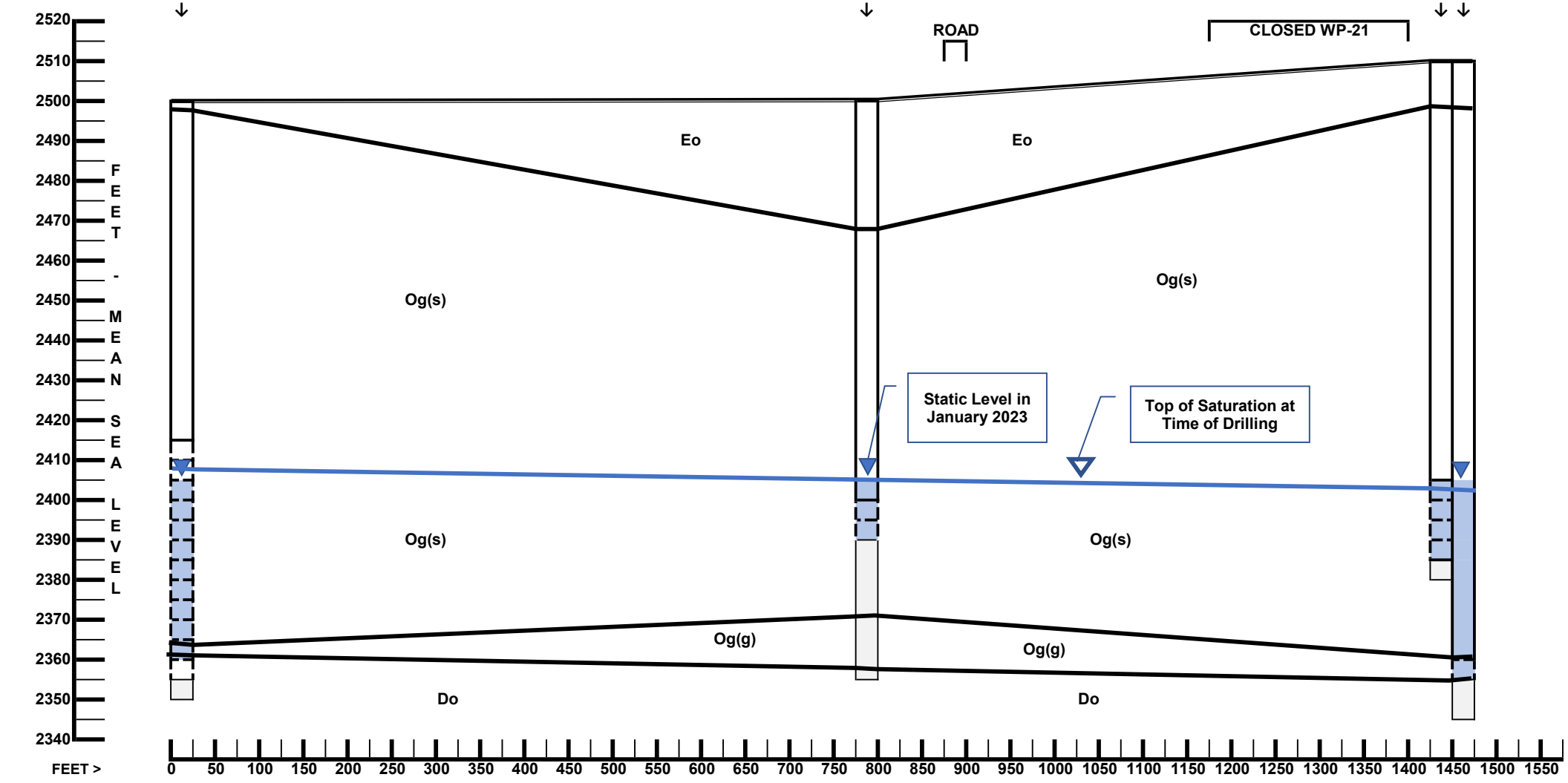


Eo - Eolian Windblown Silt & Very Fine Sand
Og(s) - Ogallala Formation Upper Fine Sand Unit
Og(g) - Ogallala Formation Lower Basal Gravel Unit
Do - Dockum Formation Red Bed Clay

Well Casing | Well Screen | Tail-Hole (Plugged)

Revision No. 1, Revision Date Oct-04-2024

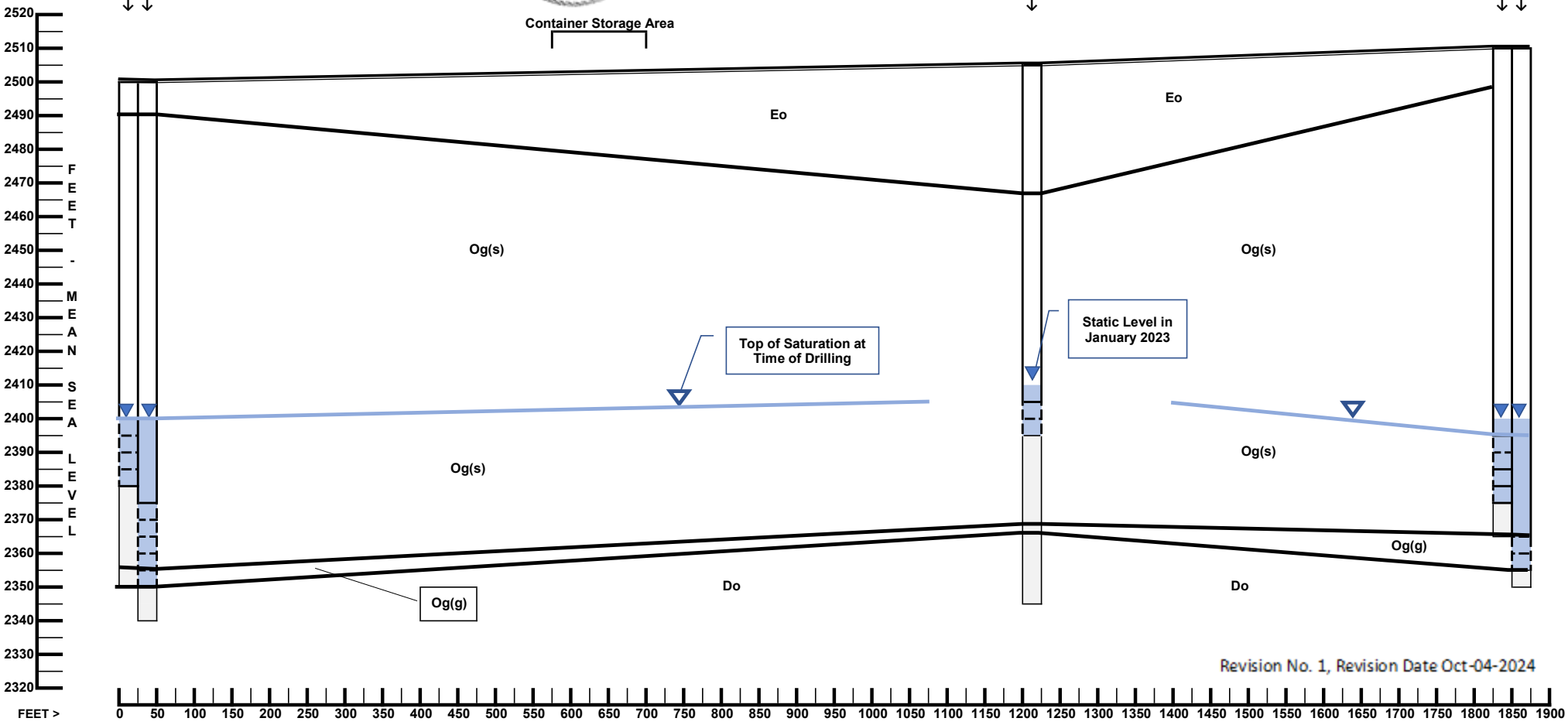
Figure VI.A.4.b.

West (D1) to East (D2) Cross-Section - Container Storage Area

Sheet 6 of 13

	D1 (West)				D2 (East)	
Well	MW-64	MW-64A		TH-5	MW-221	MW-221A
Northing	245,286	245,290		245,722	245,811	245,815
Easting	789,398	789,411		790,520	791,199	791,215
Top Casing	2502.16	2501.61		2505.5	2512.68	2512.56
Top Grade	2498.9	2499.33		2501.71	2509.49	2509.43
Date Drilled	Sep-91	Sep-91		Nov-78	Oct-97	Oct-97
Top Satur,	2401.58	2401.58		NR	2394.43	2394.43
LNAPL	none	none		none	0.03	none

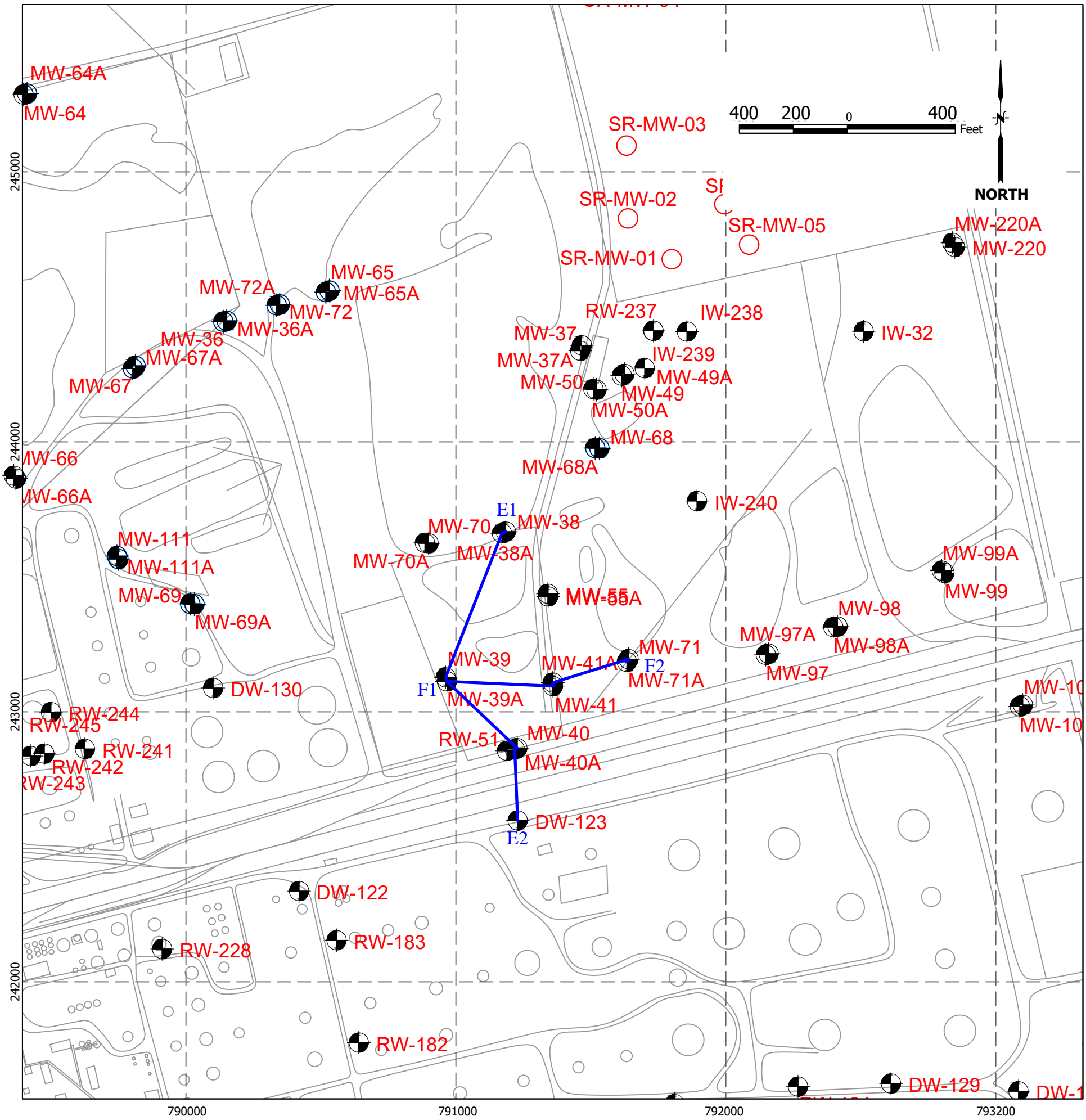
Container Storage Area



Revision No. 1, Revision Date Oct-04-2024

Lines of Cross-Sections - Site E LTU Unit

Figure VI.A.4.b [Sheet 7 of 13]



LEGEND

- Well Location
- Sid Richardson Well
- X—X Line Of Cross Sections

PREPARED BY:

Robert L. Sherrill, P.G.
Texas Registration No. PG-120
Atlas Technical Consultant, LLC
Certified Geoscience Firm No. 56038

STATE OF TEXAS
ROBERT L. SHERRILL
GEOLOGY
No. 120
LICENSED
PROFESSIONAL GEOSCIENTIST

Revision No. 1, Revision Date Oct-04-2024

Alon USA LP: Big Spring, Texas Refinery

Figure VI.A.4.b [Sheet 7 of 13]

File Name: BSPRG 2023 X-SEC MAP.dwg Drawn by: CAD2U / Approved by: RLS / Project # s270*1*328***

Figure VI.A.4.b.

North (E1) to South (E2) Cross-Section - Site E SWMU

Sheet 8 of 13

	E1 (North)						E2 (South)
Well	MW-38	MW-38A	MW-39	MW-39A	MW-40	MW-40A	DW-123
Northing	243,667	243,661	243,128	243,113	242,865	242,862	242,597
Easting	791,185	791,170	790,962	790,967	791,227	791,217	791,229
Top Casing	2500.28	2500.25	2485.47	2485.63	2480.01	2479.42	2473.8
Top Grade	2497.28	2497.41	2482.59	2482.88	2477.03	2477.07	2477.29
Date Drilled	Sep-87	Sep-87	Sep-87	Sep-87	Sep-87	Sep-87	Sep-93
Top Satur,	2401.28	2401.28	2402.59	2402.59	2389.03	2389.03	2395.61
LNAPL	none	none	none	none	none	none	none

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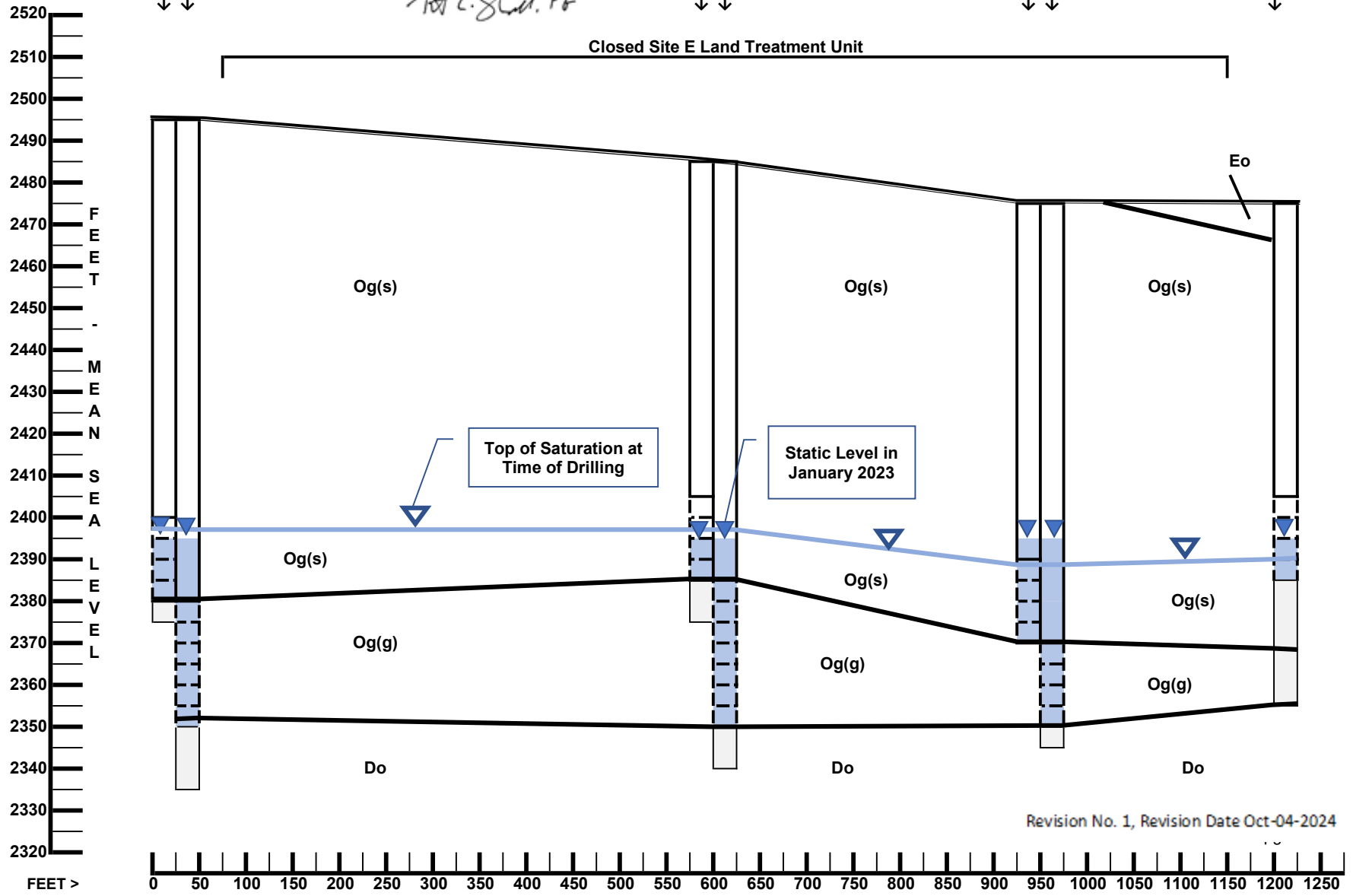
R. L. Sherrill, PG



Revision No. 1, Revision Date Oct-04-2024

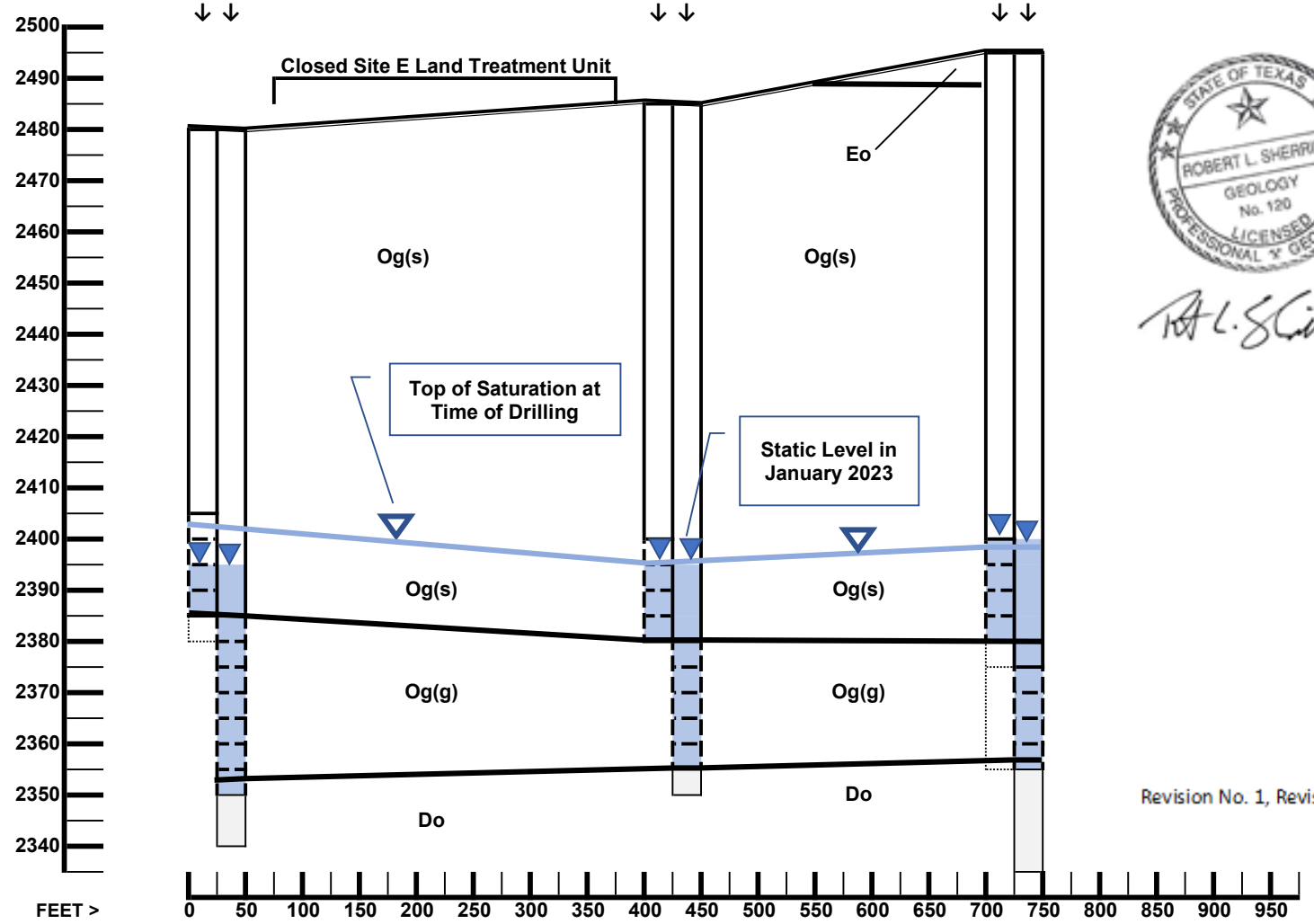
Figure VI.A.4.b.

West (F1) to East (F2) Cross-Section - Site E

Sheet 9 of 13

F1 (West)

Well	MW-39	MW-39A	MW-41	MW-41A	MW-71	MW-71A
Northing	243,128	243,113	243,095	243,108	243,195	243,185
Easting	790,962	790,967	791,359	791,358	791,639	791,633
Top Casing	2485.47	2485.63	2489.34	2489.88	2496.87	2497.03
Top Grade	2482.59	2482.88	2486.26	2486.8	2493.72	2493.8
Date Drilled	Sep-87	Sep-87	Sep-87	Sep-87	Sep-91	Sep-91
Top Satur,	2402.59	2402.59	2395.26	2395.26	2399.05	2399.05
LNAPL	none	none	none	none	none	none

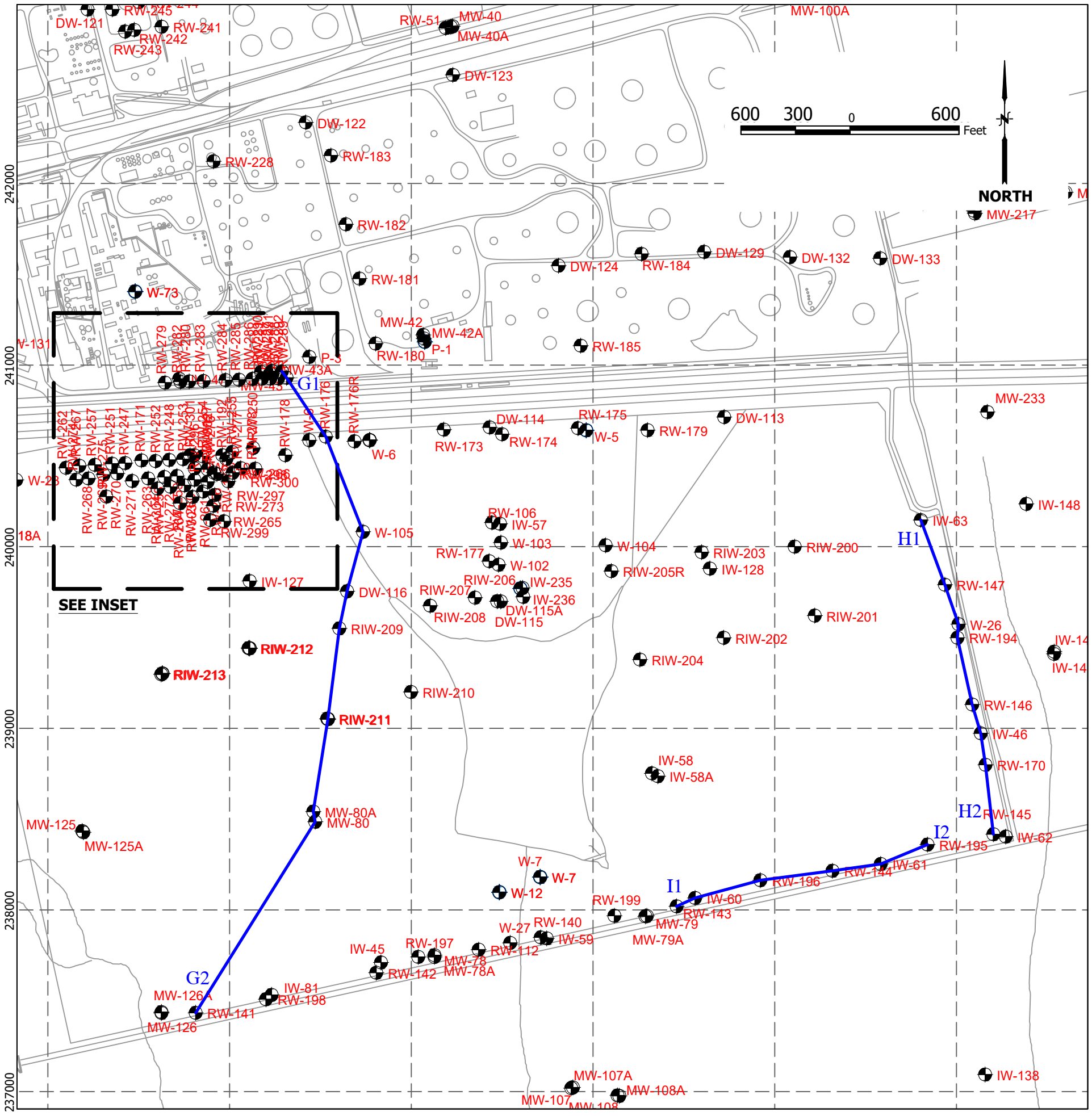


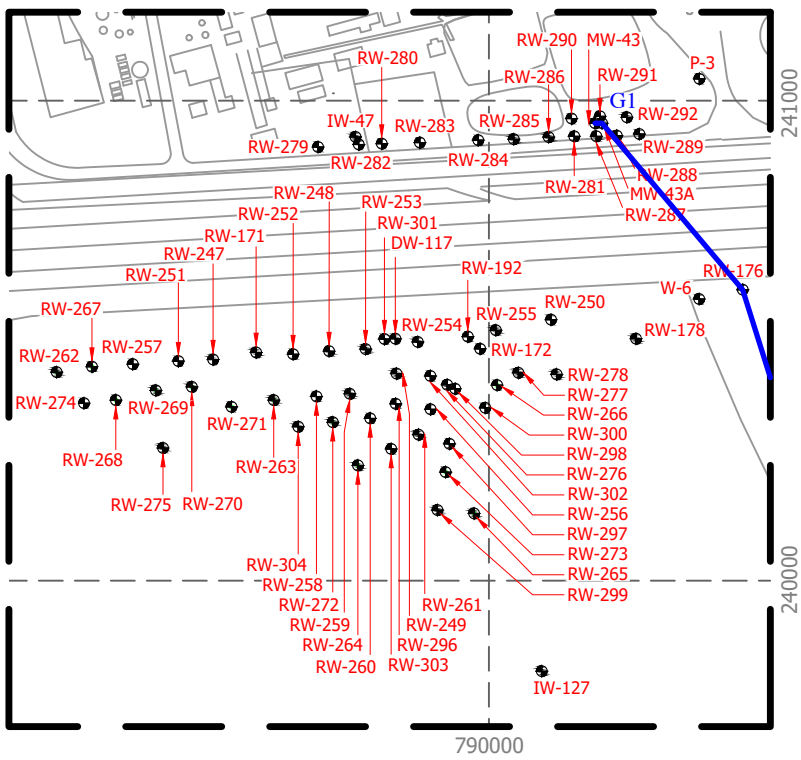
Revision No. 1, Revision Date Oct-04-2024

Eo - Eolian Windblown Silt & Very Fine Sand
Og(s) - Ogallala Formation Upper Fine Sand Unit
Og(g) - Ogallala Formation Lower Basal Gravel Unit
Do - Dockum Formation Red Bed Clay

Well Casing | Well Screen | Tail-Hole (Plugged)

Lines of Cross-Sections - BICA
Figure VI.A.4.b [Sheet 10 of 13]





INSET
(Not To Scale)

LEGEND

- Well Location
- X—X Line Of Cross Sections

PREPARED BY:

Robert L. Sherrill, P.G.
Texas Registration No. PG-120
Atlas Technical Consultant, LLC
Certified Geoscience Firm No. 56038

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Revision No. 1, Revision Date Oct-04-2024

Alon USA LP): Big Spring, Texas Refinery
Cross Section Base Maps [Sheet 10 of 13]

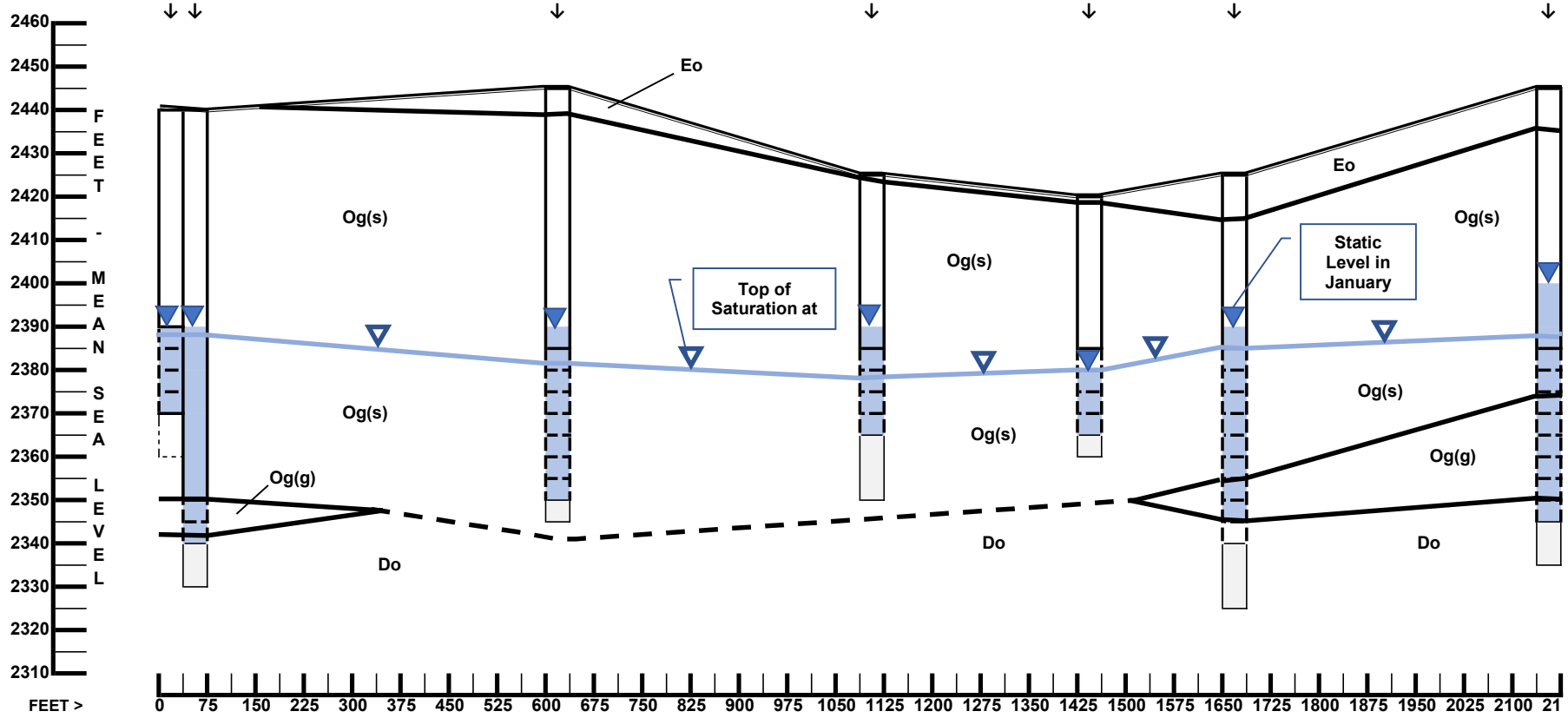
Figure VI.A.4.b.

North (G1) to South (G2) Cross-Section - BICA

Sheet 11 of 13

G1 (North)

Well	MW-43	MW-43A	RW-176	W-105	DW-116	RIW-209	RIW-211
Northing	240,953	240,953	240,596	240,083	239,755	239,550	239,051
Easting	790,222	790,236	790,720	790,734	790,647	790,604	790,541
Top Casing	2443.55	2443.15	2445.46	2428.17	2424.2	2428.66	2448.11
Top Grade	2440.5	2440.35	2444.31	2425.02	2420.78	2425.3	2445.5
Date Drilled	Sep-87	Sep-87	Sep-95	Aug-92	Sep-93	Oct-96	Oct-96
Top Satur,	2386	2386	2381.31	2377.02	2380.78	2392.3	2401.5
LNAPL	0.27	none	1.53	0.1	none	none	none



Eo - Eolian Windblown Silt & Very Fine Sand
Og(s) - Ogallala Formation Upper Fine Sand Unit
Og(g) - Ogallala Formation Lower Basal Gravel Unit
Do - Dockum Formation Red Bed Clay

Well Casing | Well Screen | Tail-Hole (Plugged)

Revision No. 1, Revision Date Oct-04-2024

Figure VI.A.4.b.
North (G1) to South (G2) Cross-Section - BICA
Sheet 11 of 13 (continued)

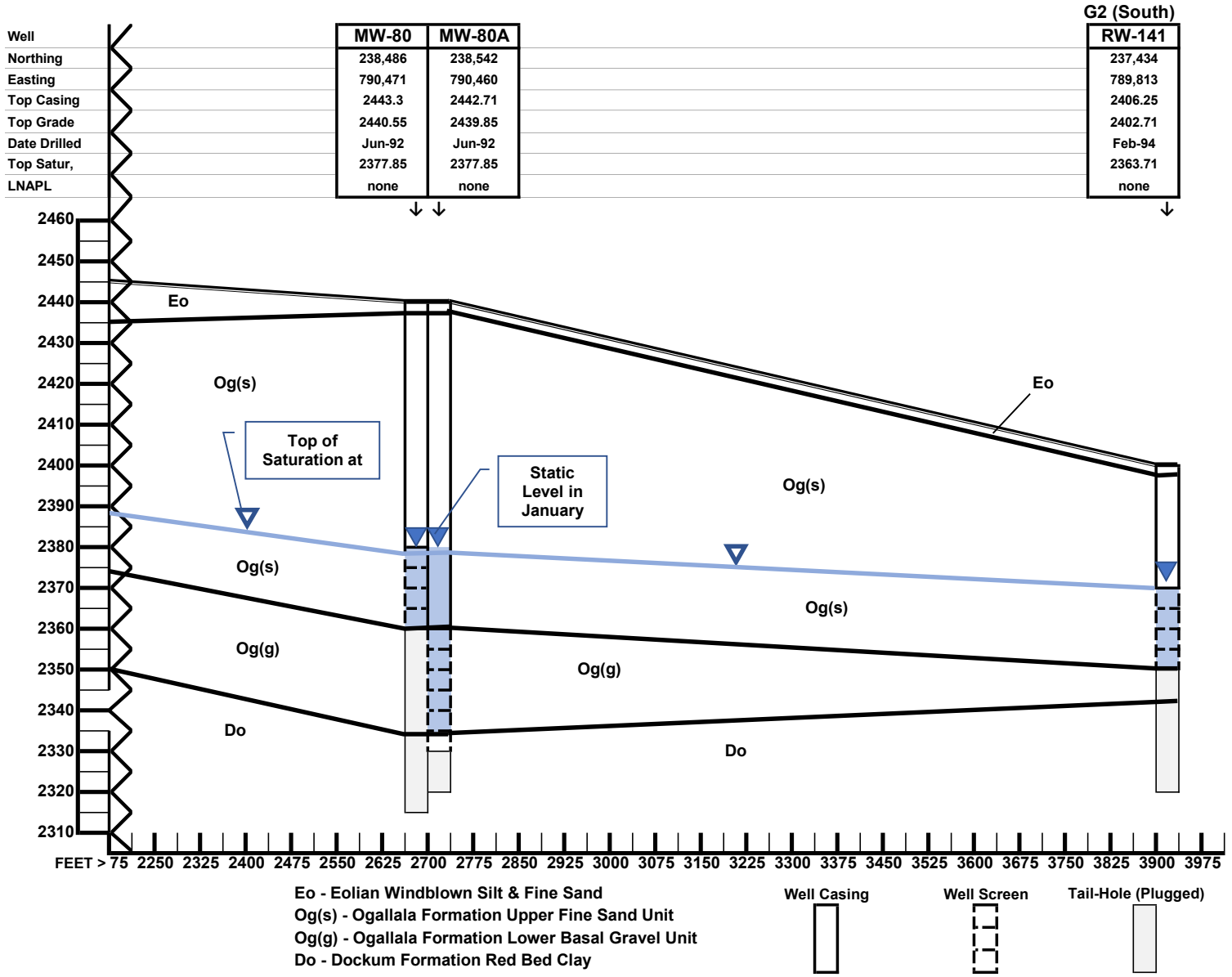
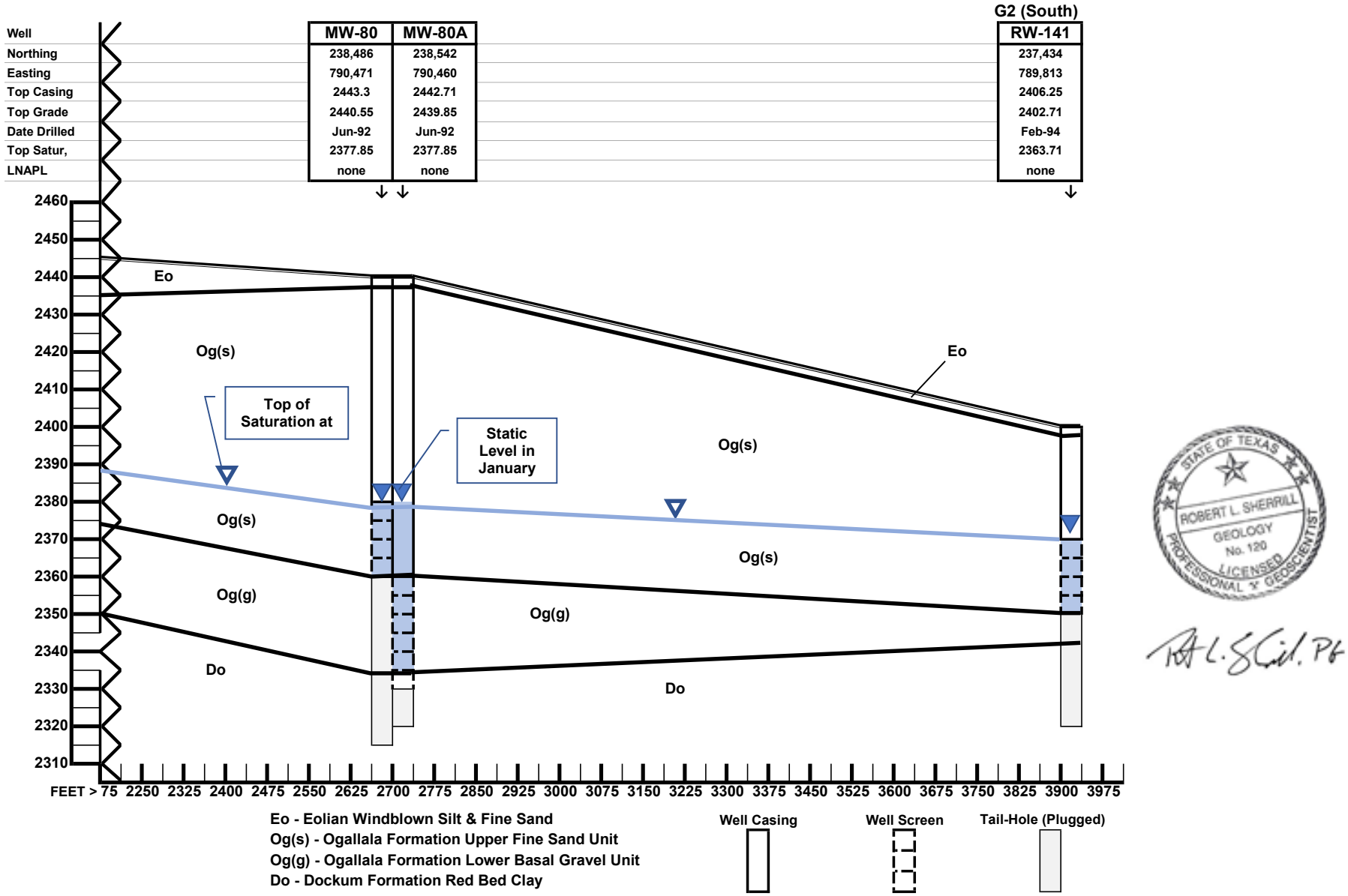


Figure VI.A.4.b.

North (G1) to South (G2) Cross-Section - BICA

Sheet 11 of 13 (continued)



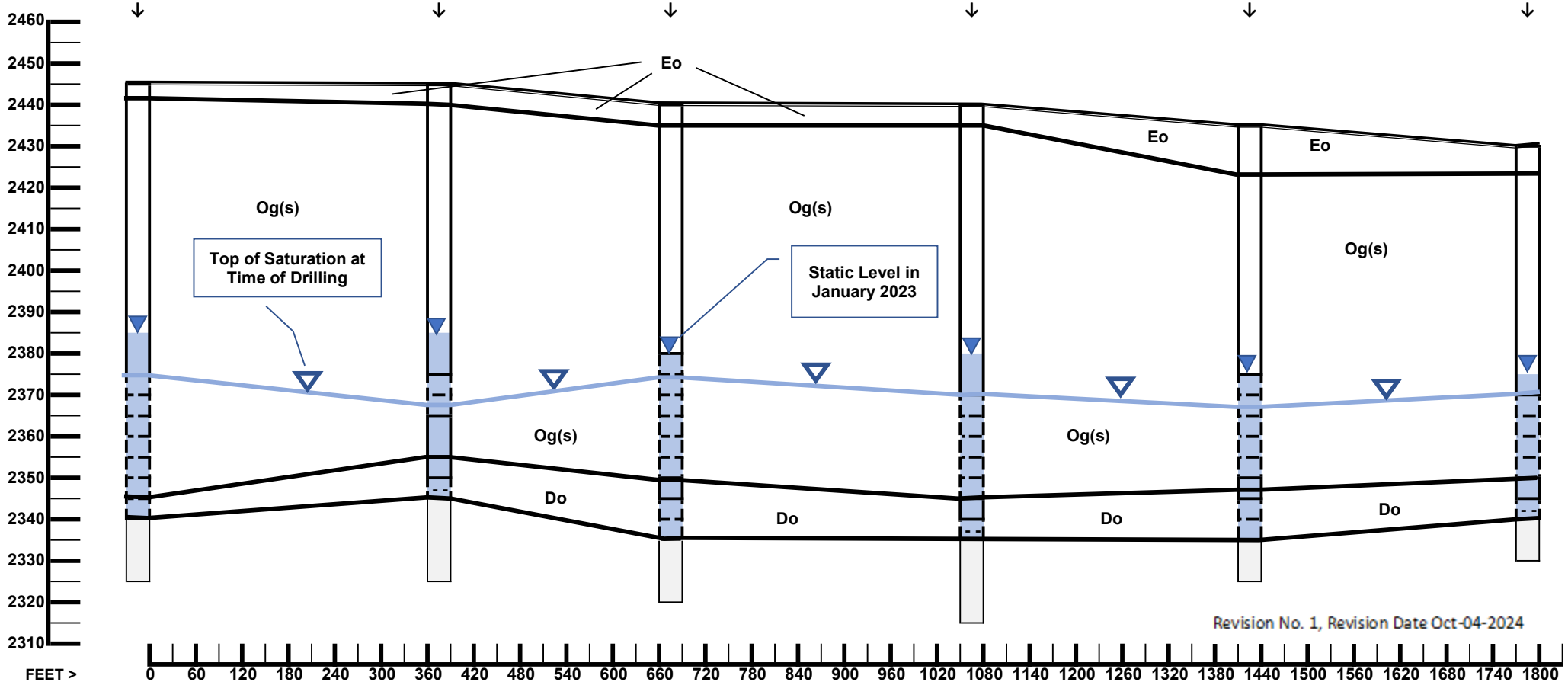
Revision No. 1, Revision Date Oct-04-2024

Figure VI.A.4.b.

North (H1) to South (H2) Cross-Section - BICA

Sheet 12 of 13

	H1 (North)					H2 (South)
Well	IW-63	RW-147	RW-194	RW-146	RW-170	RW-145
Northing	240,147	239,790	239,499	239,131	238,799	238,417
Easting	793,804	793,936	794,005	794,087	794,160	794,203
Top Casing	2450.14	2448.4	2441.86	2441.48	2435.15	2431.88
Top Grade	2447.11	2445.33	2441.5	2437.86	2433.15	2429.25
Date Drilled	Jul-90	Feb-94	Oct-96	Feb-94	Aug-95	Feb-94
Top Satur,	2374.36	2366.33	2374.5	2369.86	2367.15	2369.25
LNAPL	none	none	none	none	none	none



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Do - Dockum Formation Red Bed Clay

Well Casing | Well Screen | Tail-Hole (Plugged)

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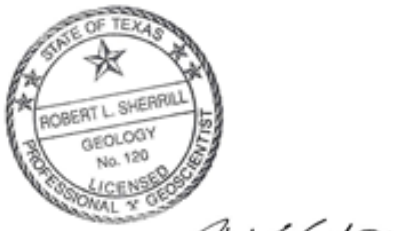
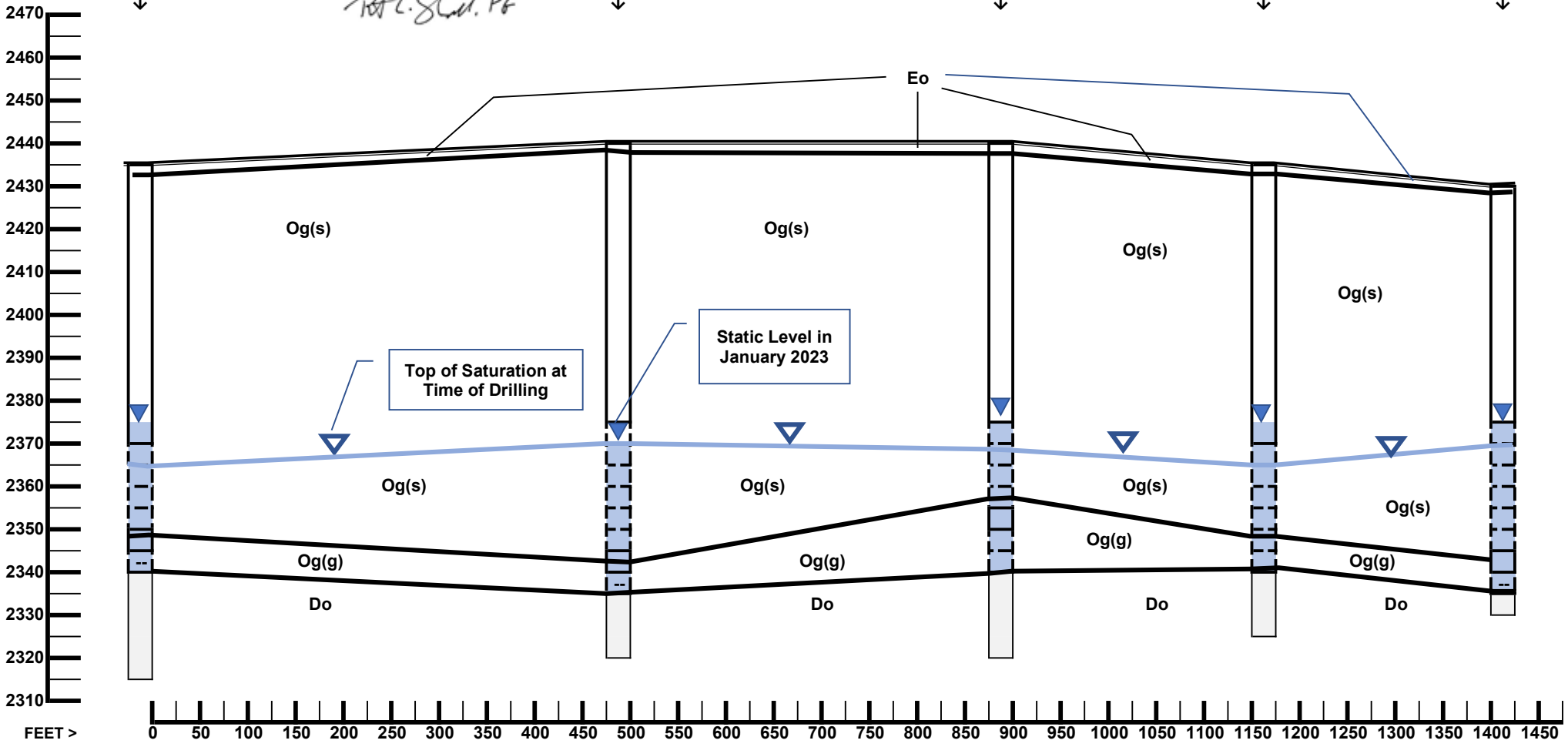
Figure VI.A.4.b.

West (I1) to East (I2) Cross-Section - BICA

Sheet 13 of 13

Well	I1 (West) RW-143	RW-196	RW-144	IW-61	I2 (East) RW-195
Northing	238,020	238,164	238,216	238,253	238,360
Easting	792,460	792,921	793,318	793,583	793,840
Top Casing	2441.83	2440.73	2440.68	2438.25	2434.41
Top Grade	2436.77	2438	2438.26	2435.5	2432.2
Date Drilled	34366	35339	34366	33055	35339
Top Satur,	2365.77	2370	2368.26	2365.75	2369.2
LNAPL	none	none	none	none	none





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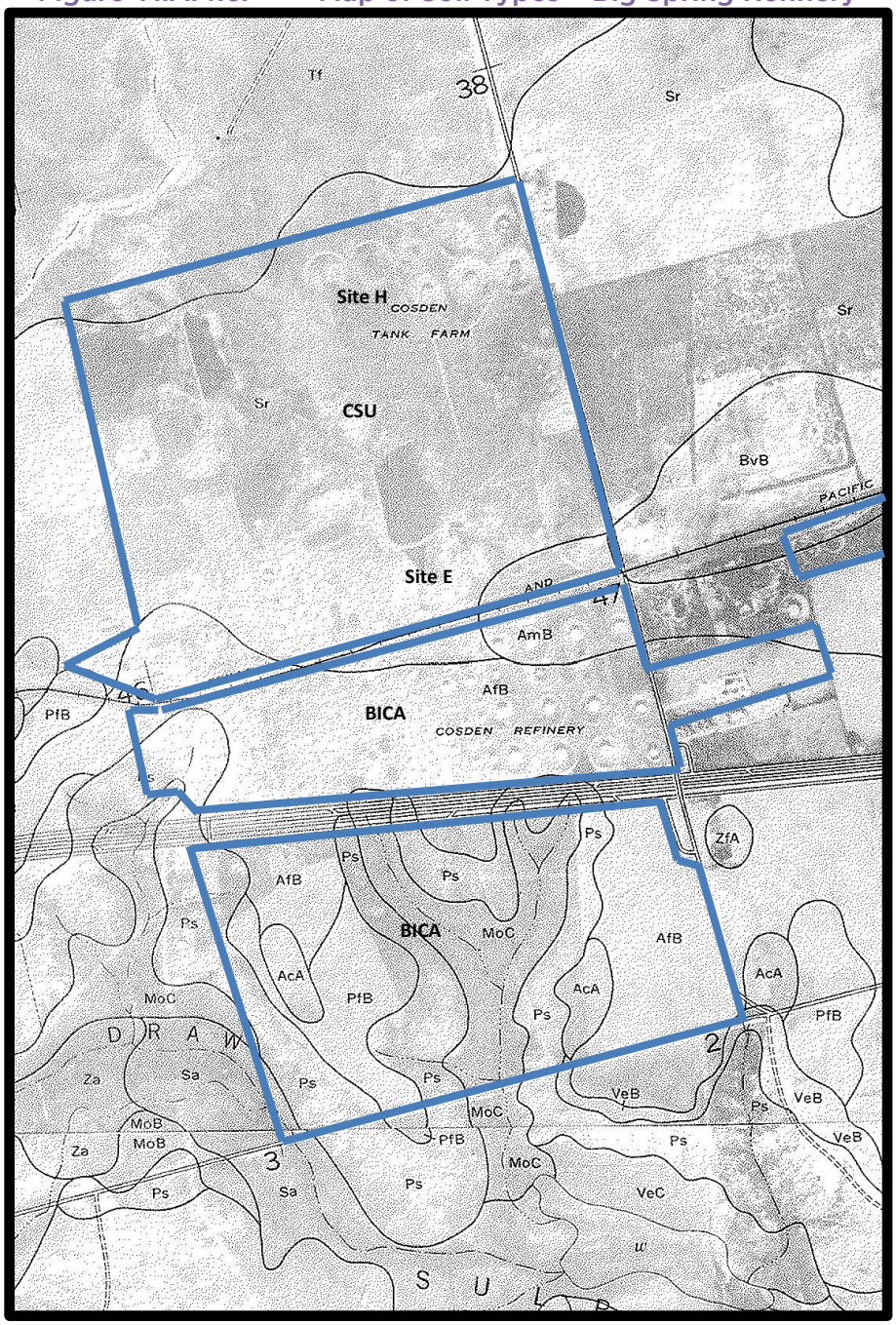
Well Casing | Well Screen | Tail-Hole (Plugged)

Revision No. 1, Revision Date Oct-04-2024

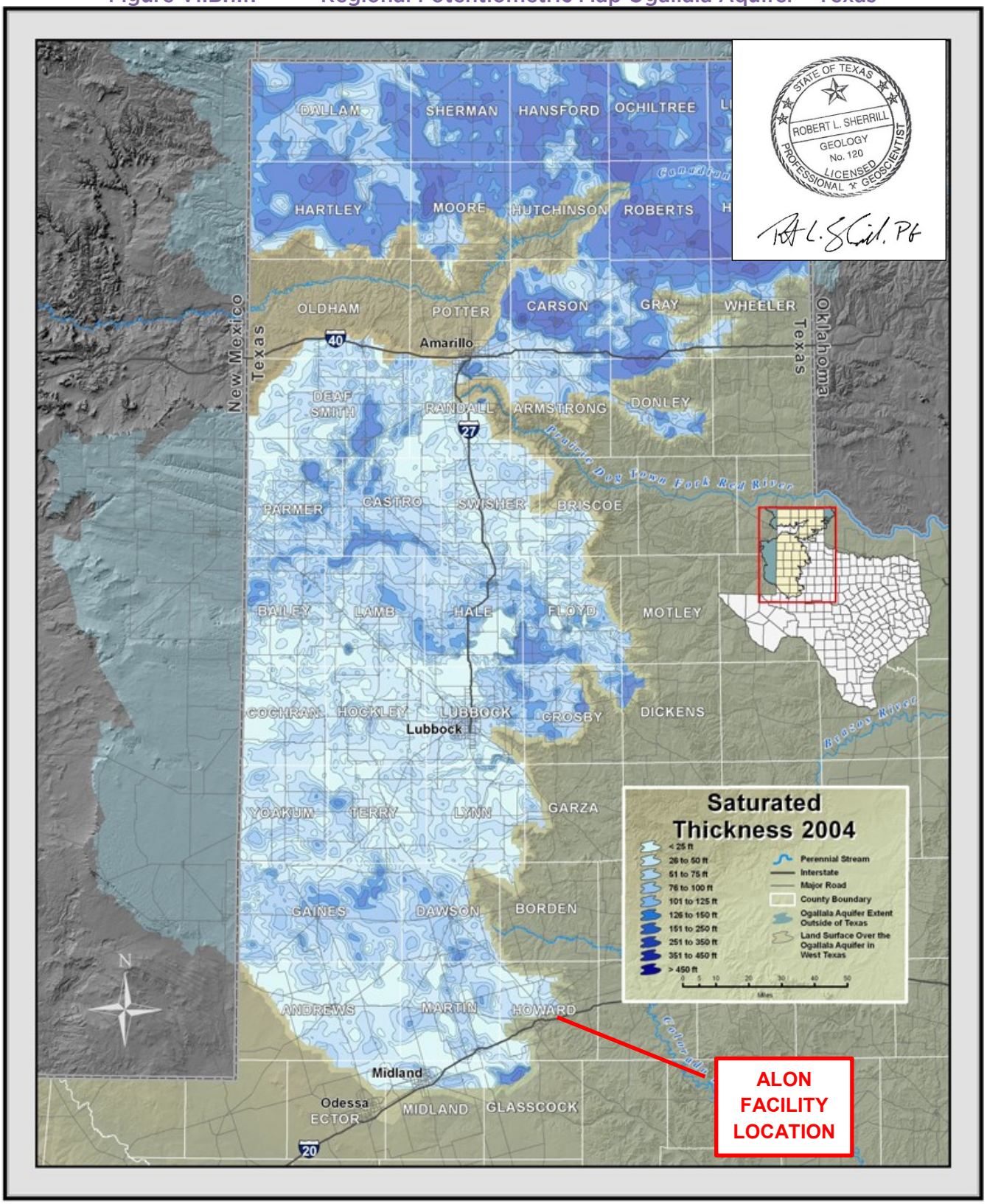
Figure VI.A.4.e. Map of Soil Types – Big Spring Refinery



Symbol	Name & Description	Symbol	Name & Description
AcA	Acuff loam 0-1% slope	Ps	Potter soils
AfB	Amarillo fine sandy loam 1-3% slope	Sa	Saline alluvial land
AmB	Amarillo fine loamy sand 0-3% slope	Sr	Springer loamy fine sand
MoB	Mobeetie fine sandy loam 1-3% slope	Tf	Tivoli fine sand
MoC	Mobeetie fine sandy loam 3-5% slope	Za	Zavala fine sandy loam
PfB	Portales fine sandy loam 1-3% slope		

Source: US Department of Agriculture Soil Conservation Survey, Howard County, Texas (1969)

Figure VI.B.1.f. Regional Potentiometric Map Ogallala Aquifer - Texas



Source: Texas Tech University Center for Ogallala Studies

Figure VI.B.2.c-1 Iso-Contour Map of Top of Ogallala FM Basal Gravel Unit

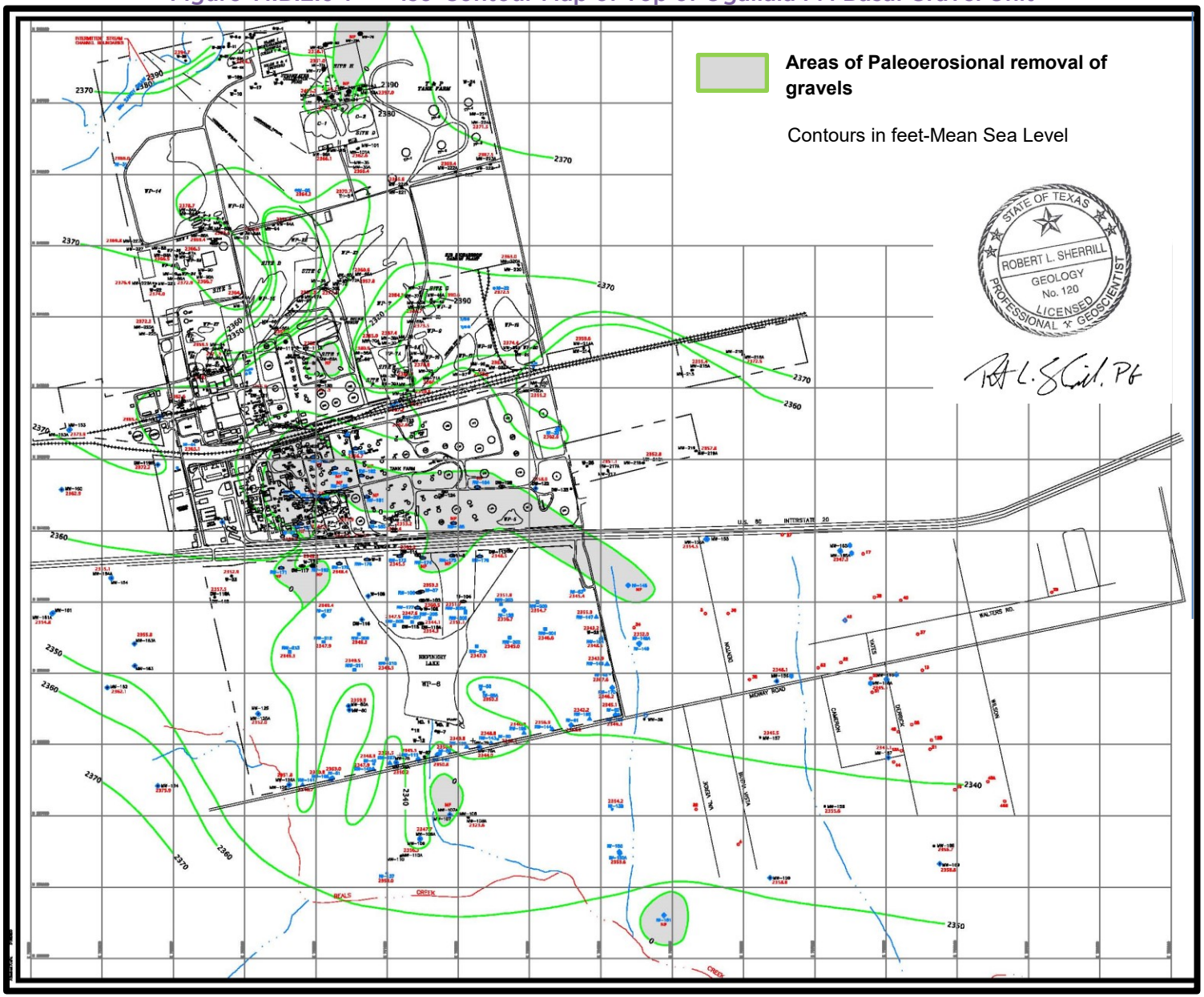
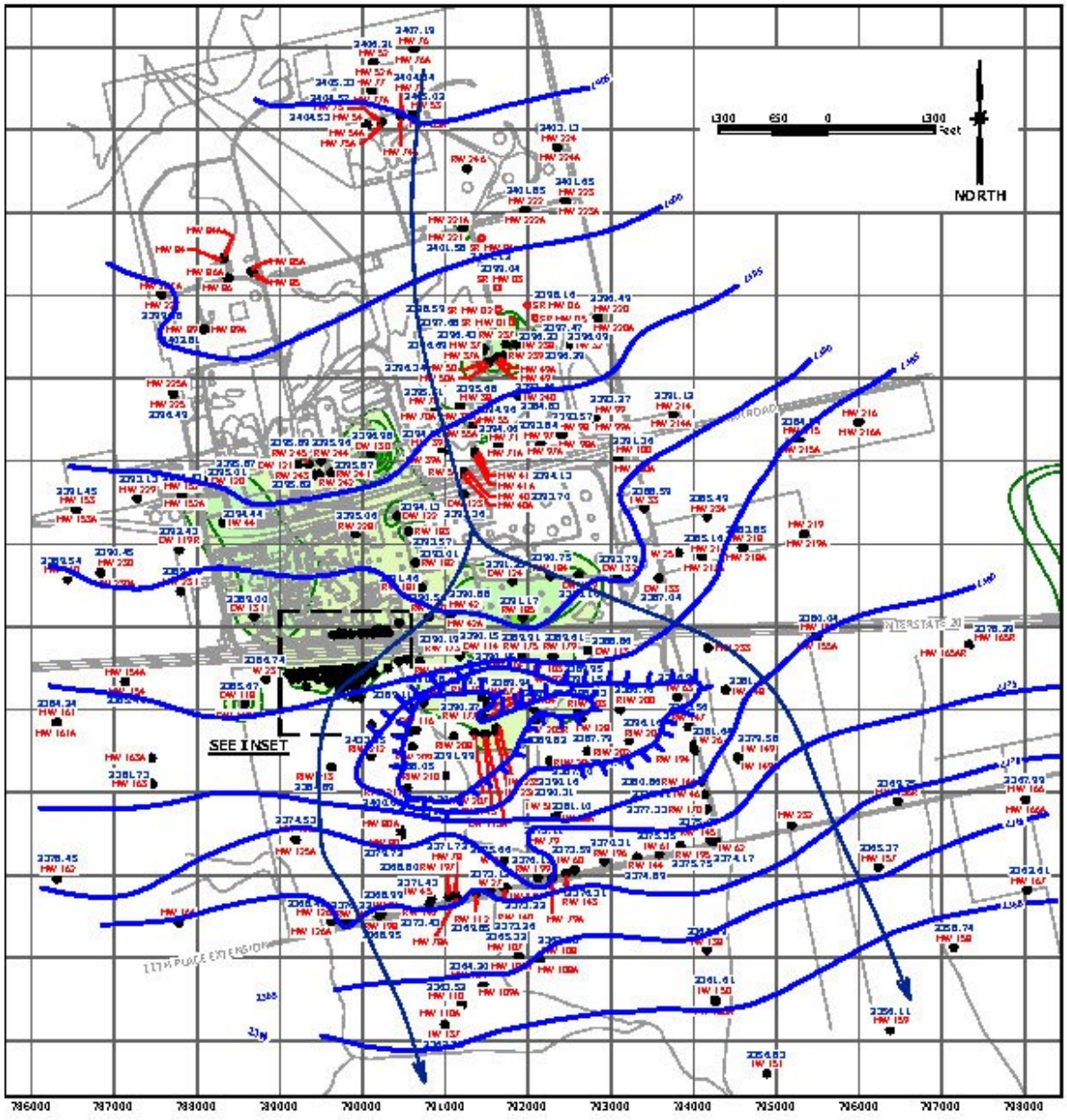
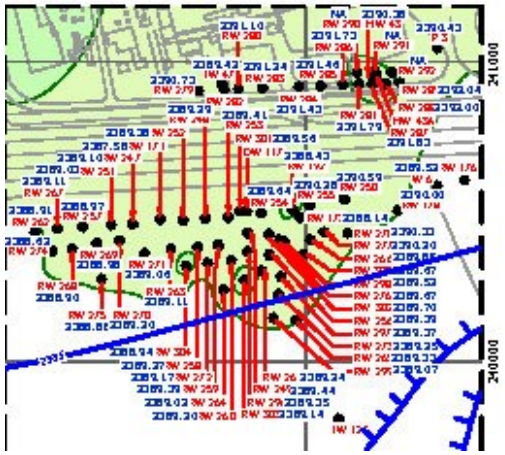


Figure VI.B.2.c.-2 Isocontour Map of Top of Dockum Formation Red-Bed Clay

Figure VI.B.2.d. Potentiometric Map of Water Levels & Net Thickness Map of LNAPL





LEGEND

- Well Location
- Bd Richardson Well
- Contour of Equal Potentiometric (Feet Above MSL)
- Groundwater Flow Direction
- Extended Elevation Mound

Phase Separated Hydrocarbon Thickness (Feet)

- 0-2
- 2-4
- 4-6
- 6-8
- 8-10
- 10+

PREPARED BY:
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Texas Registration No. 2G-120
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Certified Geoscience Firm No. 50038

STATE OF TEXAS
ROBERT L. SHERRILL
GEOLOGY
No. 120
LICENSED
PROFESSIONAL GEOSCIENTIST

Figure VI.B.3.e._Sheet 1 of 9 Well Locations

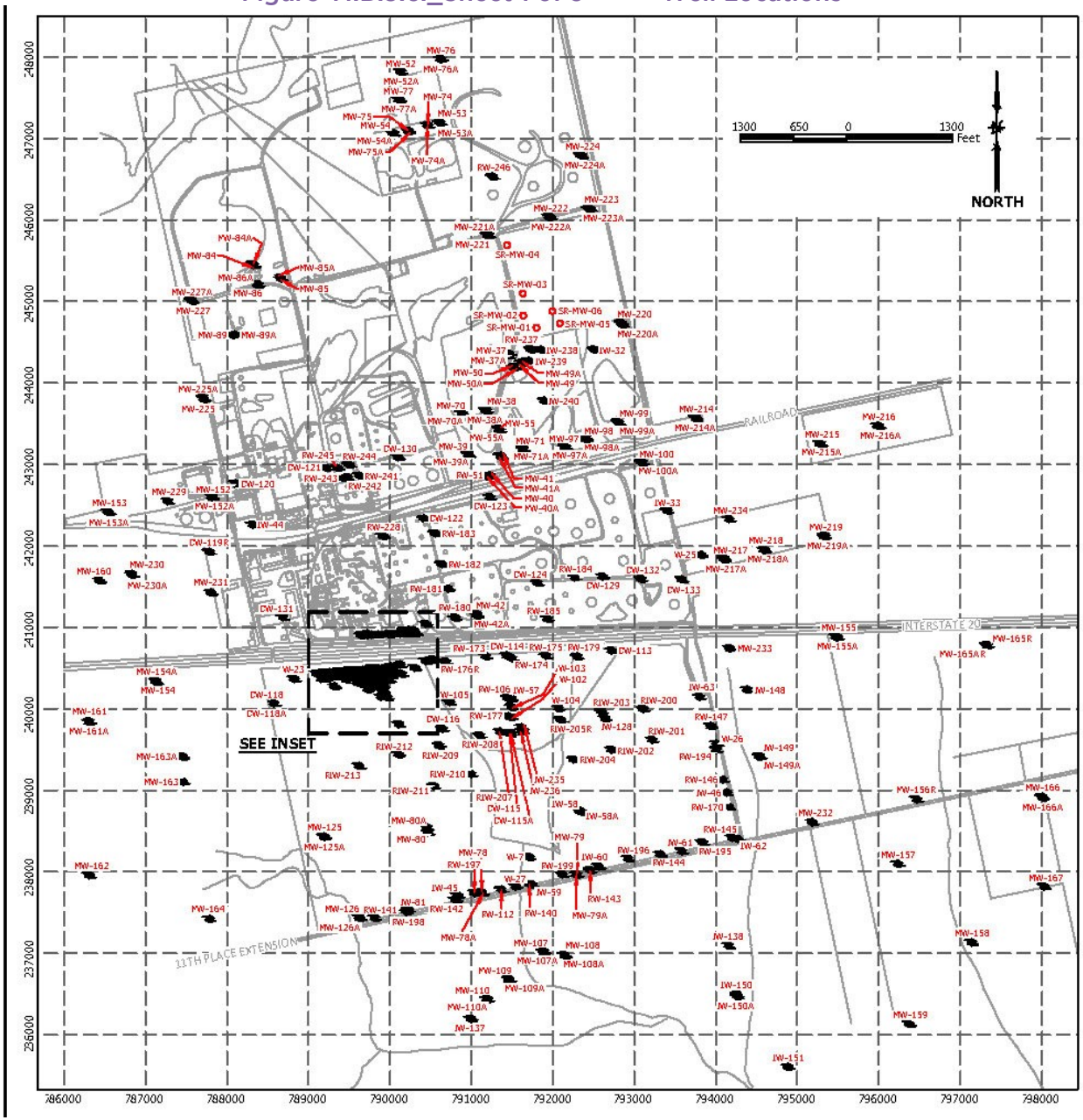


Figure VI.B.3.e._Sheet 2 of 9 Monitoring Information

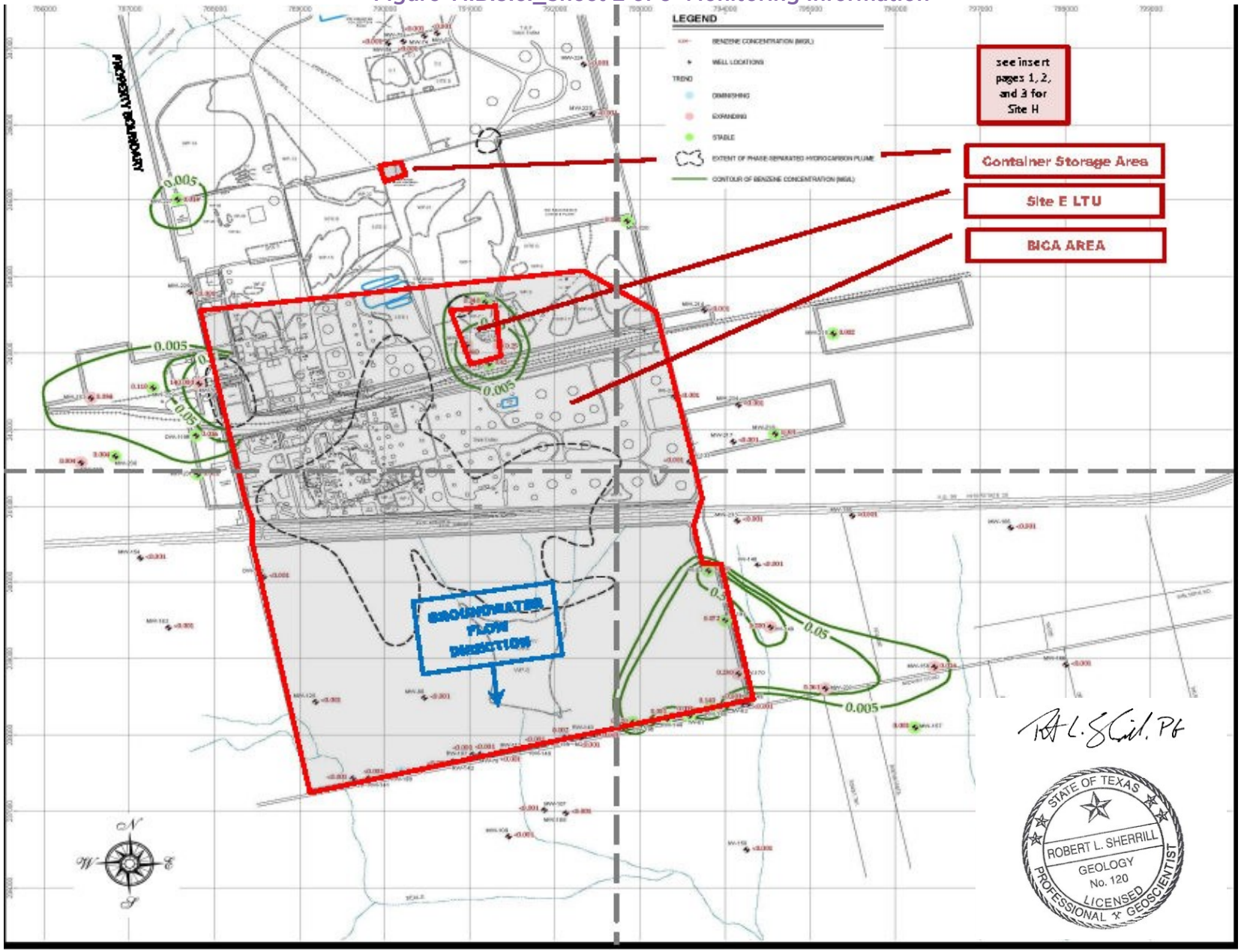


Figure VI.B.3.e._Sheet 3 of 9 Monitoring Information (Northwest Quad.)

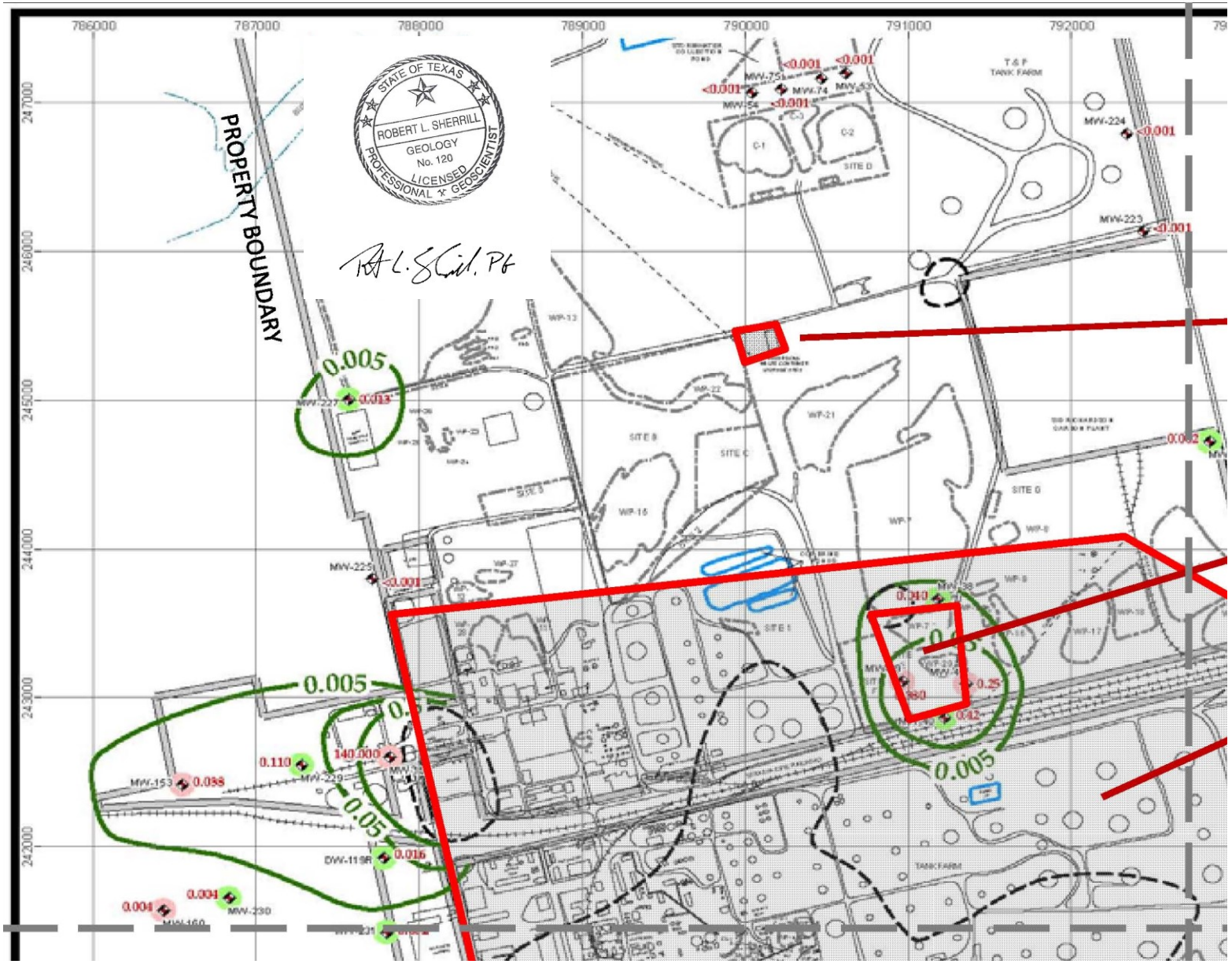
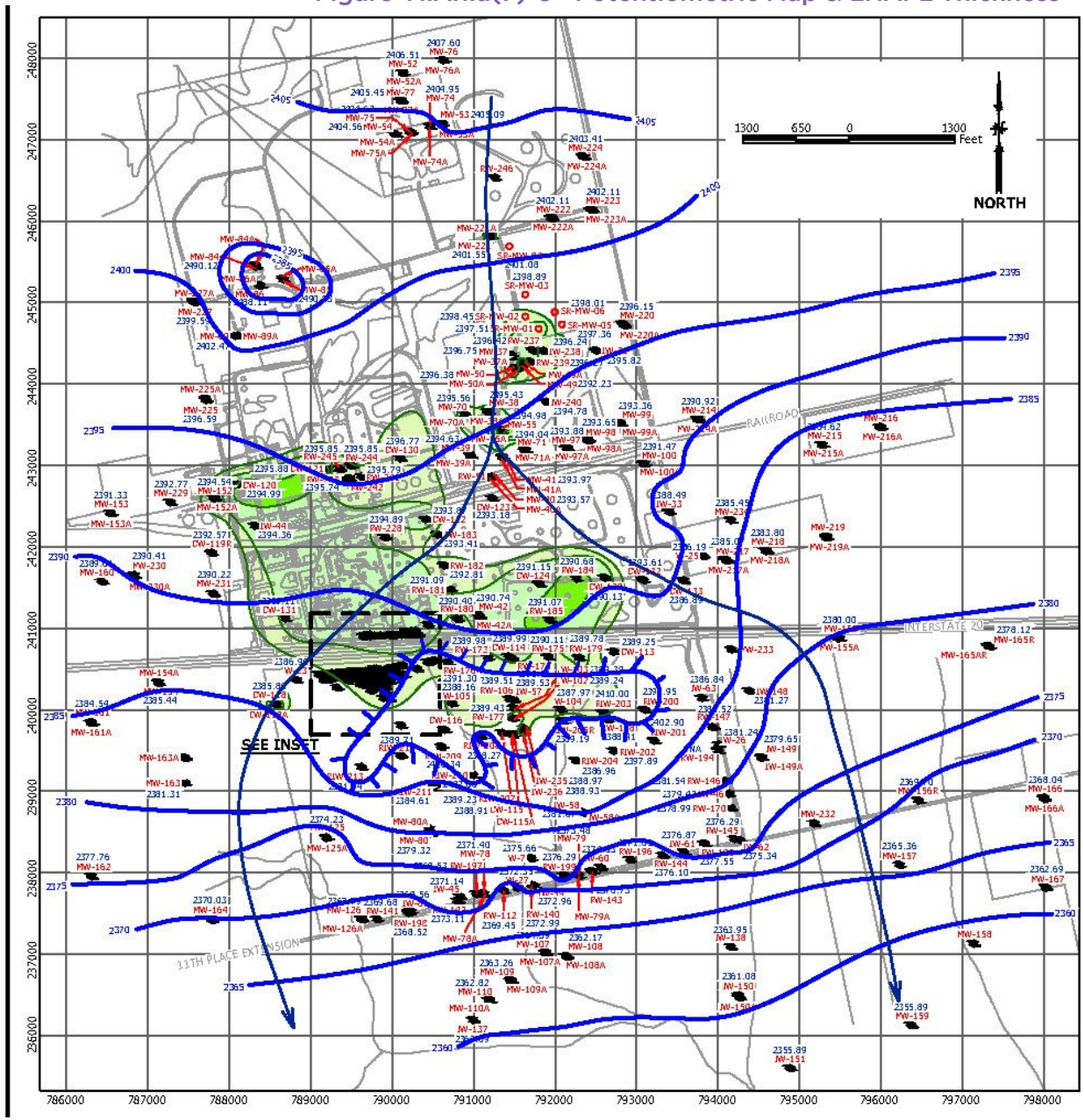


Figure VI.A.1.a(7)-3 Potentiometric Map & LNAPL Thickness – July 2022



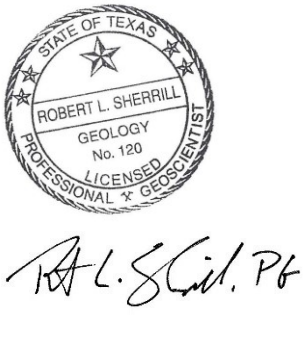


Figure VI.B.3.e._Sheet 7 of 9 Monitoring Information (Site H Groundwater Monitoring)

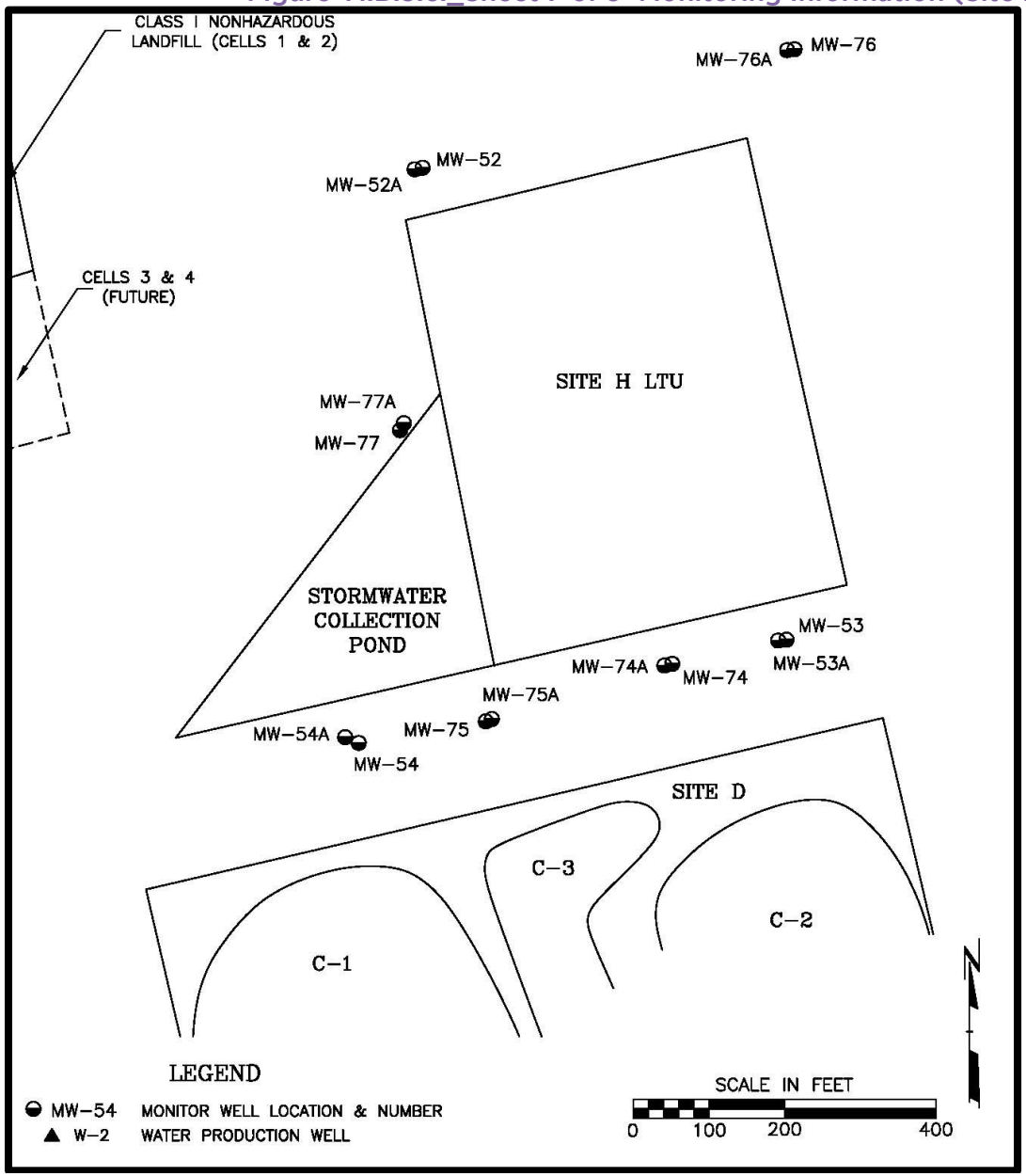


Figure VI.B.3.e._Sheet 4 of 9 Monitoring Information (Northeast Quad.)

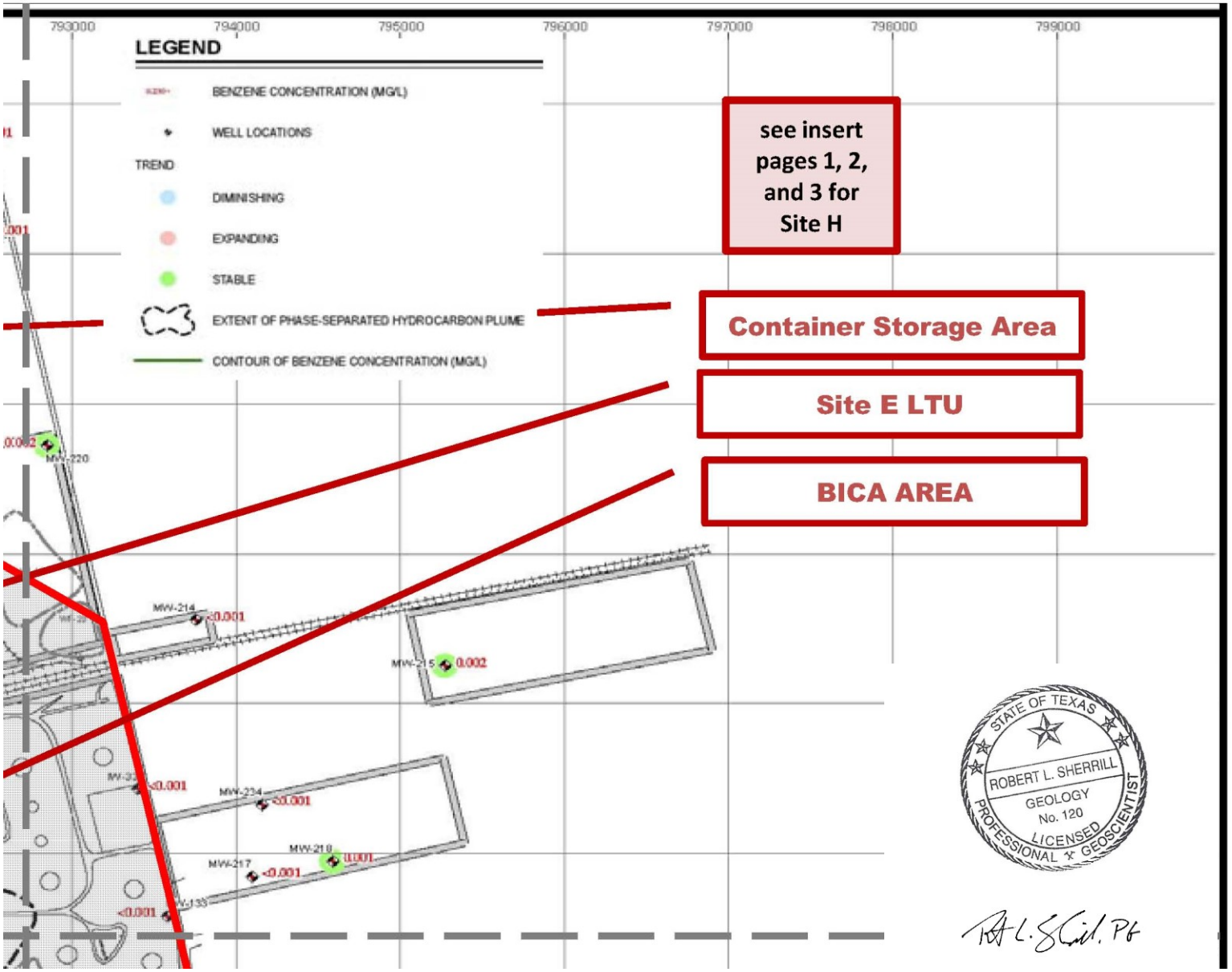


Figure VI.B.3.e._Sheet 6 of 9 Monitoring Information (Southeast Quad.)

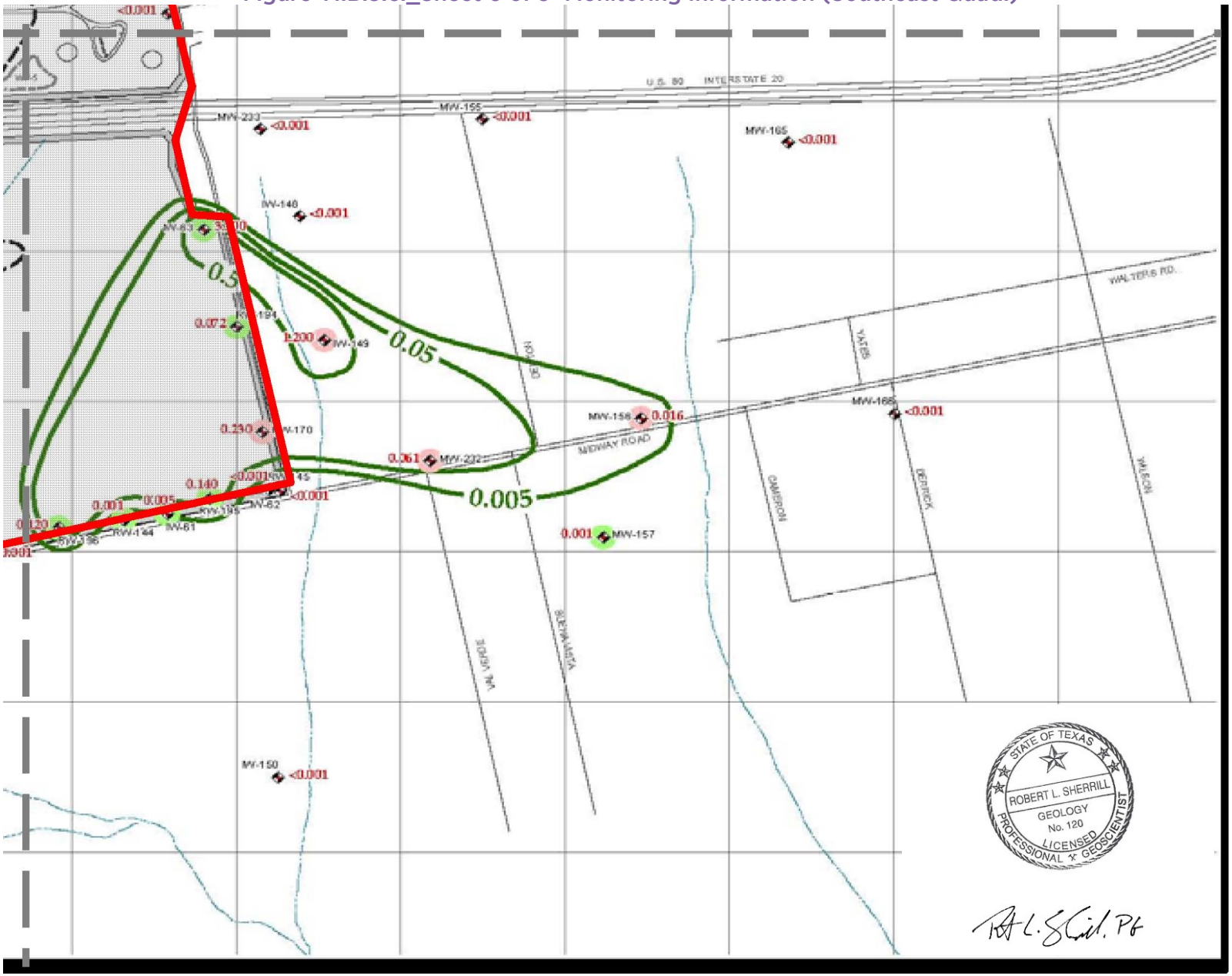


Figure VI.B.3.e._Sheet 6 of 9 Monitoring Information (Southeast Quad.)

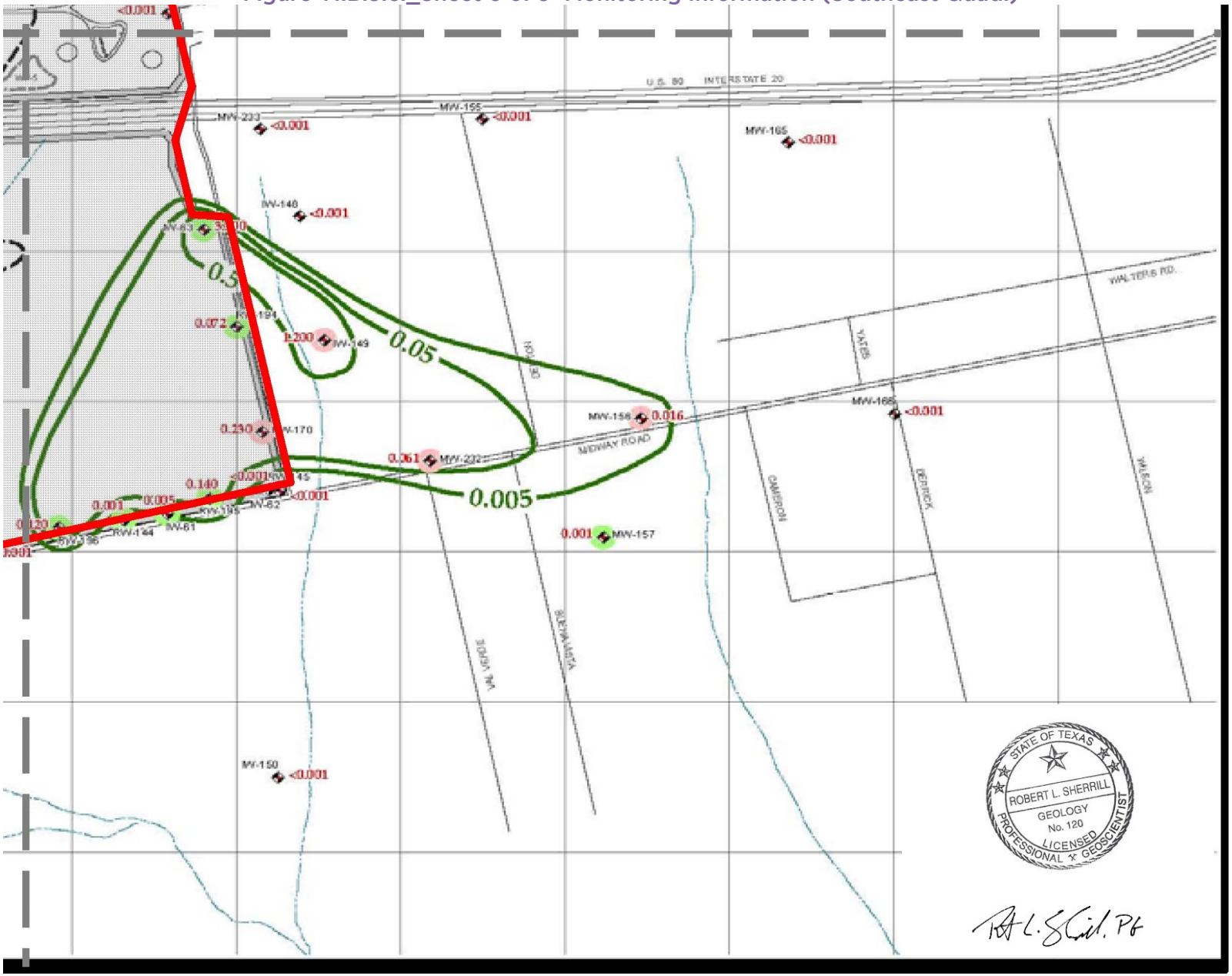
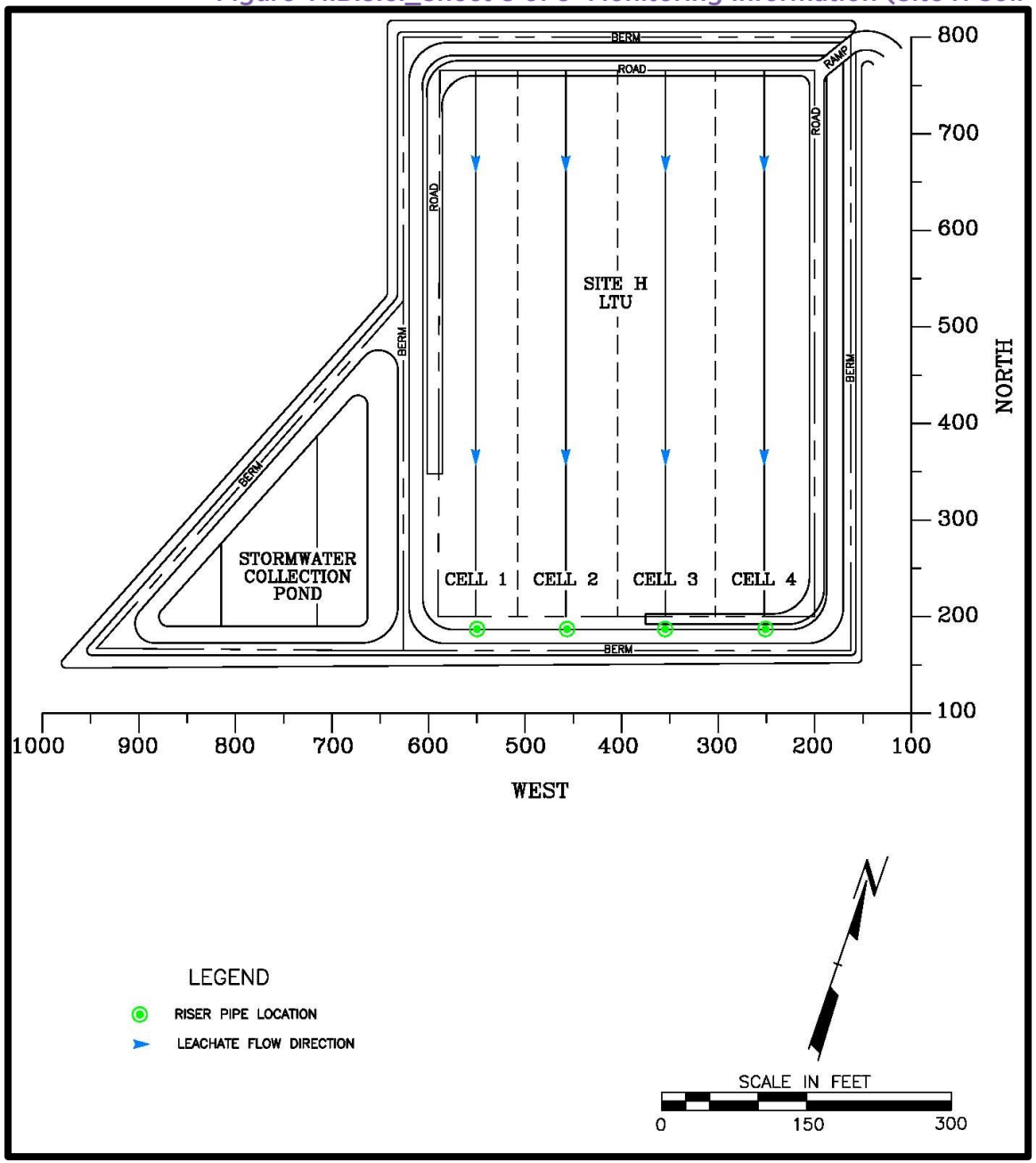


Figure VI.B.3.e._Sheet 8 of 9 Monitoring Information (Site H Soil-Pore Liquid Monitoring)



ATTACHMENT VI.B.3.A SITE H BACKGROUND CONCENTRATION DETERMINATIONS

019569.1

Jeff Morris
Refinery Manager

Fina Oil and Chemical Company
P.O. Box 1311
Big Spring, Texas 79721
915/263-7661

August 27, 1993

Ms. Christine Peckham, Supervisor
Facility Team I, Permits Section
Industrial and Hazardous Waste Division
Texas Water Commission
P.O. Box 13087 - Capitol Station
Austin, Texas 78711-3087

Re: Fina Oil and Chemical Company, Big Spring Facility
Hazardous Waste Permit HW-50140
Proposed Statistical Methods for the Evaluation of
Ground-Water Data Collected from the Site H LTU

Dear Ms. Peckham:

This letter will identify the proposed statistical methods for the evaluation of ground-water data collected from the Site H land treatment unit (LTU) at the Fina Oil and Chemical Company (Fina) Big Spring refinery. The selected statistical methods and the justification for their usage in evaluating the ground-water data have been developed by our consultant. The statistical methods will facilitate the evaluation of semiannual ground-water data collected during the detection monitoring program for the unit and are proposed for Texas Water Commission (TWC) approval in accordance with Provision III.J.3. of Permit HW-50140.

The collection of one year of background ground-water data from the two upgradient well clusters (MW-52/52A and MW-76/76A) as specified in Provision III.J.1.a. of the permit has been completed. Summaries of the ground-water analytical data obtained from the Site H LTU upgradient wells during the four quarterly sampling events that comprised the "first year after permit issuance" are included in Attachment 1 to this letter. Background values for each of the water quality and detection monitoring parameters listed in "Attachment H" of the permit have been developed in accordance with Provision III.J.2. of the permit and served as the basis for the selection of the proposed statistical methods. These background values are presented in Attachment 2 to this letter.

Although Provision III.J.3. of the permit specifies that the proposed statistical method(s) should be selected from the procedures outlined in the Environmental Protection Agency (EPA) guidance document entitled "Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, April 1989 (EPA SW/530-89-026)", the nature of the analytical parameters and the characteristics of the background ground-water data collected necessitated the selection of other statistical procedures in addition to those identified in the

EPA guidance document. An overview of the statistical methods proposed for the evaluation of the Site H LTU ground-water data (and the sources of the methods) is provided in Attachment 3.

Statistical evaluations are currently being conducted for the detection monitoring parameters (i.e., total organic carbon, pH, arsenic, chromium, lead, selenium, phenolics, benzene, and toluene) in the ground-water data collected quarterly during the first year after permit issuance in accordance with Provision III.J.7. utilizing the methods presented herein. Additionally, the ground-water data for the detection monitoring parameters collected during the second and subsequent years after permit issuance will be evaluated on a semiannual basis in accordance with Provision III.J.8. of the permit. Furthermore, statistical evaluations will be conducted in the future for any water quality parameter (i.e., ammonia, bicarbonate, calcium, chloride, magnesium, nitrate, sodium, or sulfate) for which the trend analysis specified in permit Provision III.J.9. indicates that a statistically significant concentration increase has potentially occurred.

Should any questions or other concerns arise upon your review of the information presented herein, please contact Mr. Morris Lee at (915) 263-9457 at your earliest convenience.

Sincerely,

Jeff Morris
Refinery Manager

JDM/FCD/DSW

Attachments

cc: Bill Lockey, TWC District 10 Manager
Ted Nairn
Fred C. Dalbey, Jones and Neuse, Inc., Austin
Robert R. Paules, Jr., P.E., Jones and Neuse, Inc., Austin
Morris Lee
Eston Hollis

ATTACHMENT 1

SUMMARY OF BACKGROUND GROUND-WATER ANALYTICAL DATA

SUMMARY OF RESULTS FROM ANALYSIS OF SITE H LTU SHALLOW WELL GROUND-WATER SAMPLES FIRST QUARTERLY EVENT -- JULY 1992

- **MW-52 (upgradient)**

Constituent (mg/L)	Sample #1	Sample #2	Sample #3	Sample #4
Water Quality Parameters				
• Ammonia	< 0.01	0.03[1]	< 0.01	0.01[1]
• Bicarbonate	176	174	176	176
• Calcium	170	170	180	170
• Chloride	172	170	174	170
• Magnesium	20	19	20	21
• Nitrate	1.92	1.82	1.89	1.74
• Sulfate	130	120	150	130
• Sodium	50	50	60	50
Detection Monitoring Parameters				
• pH (std units)	7.31	NA	NA	NA
• TOC	1	1	1	1
• Arsenic	0.008	0.009	0.009	0.009
• Chromium	0.005	< 0.005	< 0.005	0.005
• Selenium	< 0.05	< 0.05	< 0.05	< 0.05
• Lead	< 0.005	< 0.005	< 0.005	< 0.005
• Total Phenolics	< 0.001	< 0.001	< 0.001	< 0.001
• Benzene (μg/L)	< 1.0	< 1.0	< 1.0	< 1.0
• Toluene (μg/L)	< 1.0	< 1.0	< 1.0	< 1.0
Other Parameters				
• Specific Conductance (μmho/cm)	104	NA	NA	NA
• TDS	800	808	769	792

SUMMARY OF RESULTS FROM ANALYSIS OF SITE H LTU SHALLOW WELL GROUND-WATER SAMPLES FIRST QUARTERLY EVENT -- JULY 1992

- **MW-76 (upgradient)**

Constituent (mg/L)	Sample #1	Sample #2	Sample #3	Sample #4
Water Quality Parameters				
• Ammonia	0.05[2]	0.07[2]	0.04[2]	0.06[2]
• Bicarbonate	180	200	184	182
• Calcium	120	130	150	140
• Chloride	110	108	110	112
• Magnesium	14	13	13	13
• Nitrate	1.46	1.41	1.27	1.25
• Sulfate	65	66	67	64
• Sodium	70	70	70	60
Detection Monitoring Parameters				
• pH (std units)	7.07	NA	NA	NA
• TOC	1	1	1	1
• Arsenic	0.007	0.007	0.007	0.008
• Chromium	< 0.005	0.005	0.005	< 0.005
• Selenium	< 0.05	< 0.05	< 0.05	< 0.05
• Lead	< 0.005	< 0.005	< 0.005	< 0.005
• Total Phenolics	< 0.001	0.008	0.007	0.008
• Benzene (μg/L)	< 1.0	< 1.0	< 1.0	< 1.0
• Toluene (μg/L)	< 1.0	< 1.0	< 1.0	< 1.0
Other Parameters				
• Specific Conductance (μmho/cm)	820	NA	NA	NA
• TDS	524	519	513	529

SUMMARY OF RESULTS FROM ANALYSIS OF SITE H LTU SHALLOW WELL GROUND-WATER SAMPLES SECOND QUARTERLY EVENT -- OCTOBER 1992

- **MW-52 (upgradient)**

Constituent (mg/L)	Sample #1	Sample #2	Sample #3	Sample #4
Water Quality Parameters				
• Ammonia	< 0.05	< 0.05	< 0.05	< 0.05
• Bicarbonate	172	172	176	174
• Calcium	148	146	146	133
• Chloride	174	176	178	172
• Magnesium	18	22	18	20
• Nitrate	1.58	1.52	1.30	1.80
• Sulfate	180	170	150	140
• Sodium	38	42	42	44
Detection Monitoring Parameters				
• pH (std units)	7.28	7.37	7.38	7.44
• TOC	1	1	1	1
• Arsenic	0.010	0.008	0.009	0.010
• Chromium	< 0.005	< 0.005	< 0.005	< 0.005
• Selenium	< 0.05[1]	< 0.05[1]	< 0.05[1]	< 0.05[1]
• Lead	< 0.005	< 0.005	< 0.005	< 0.005
• Total Phenolics	< 0.005	< 0.005	< 0.005	< 0.005
• Benzene (µg/L)	< 1.0	< 1.0	< 1.0	< 1.0
• Toluene (µg/L)	< 1.0	< 1.0	< 1.0	< 1.0
Other Parameters				
• Specific Conductance (µmho/cm)	450	448	432	421
• TDS	871	790	813	741

SUMMARY OF RESULTS FROM ANALYSIS OF SITE H LTU
SHALLOW WELL GROUND-WATER SAMPLES
SECOND QUARTERLY EVENT -- OCTOBER 1992

- **MW-76 (upgradient)**

Constituent (mg/L)	Sample #1	Sample #2	Sample #3	Sample #4
Water Quality Parameters				
• Ammonia	< 0.05	< 0.05	< 0.05	< 0.05
• Bicarbonate	180	182	182	176
• Calcium	84	91	92	98
• Chloride	114	116	116	124
• Magnesium	10	12	11	12
• Nitrate	1.68	1.68	1.20	1.21
• Sulfate	73	76	74	90
• Sodium	45	48	53	70
Detection Monitoring Parameters				
• pH (std units)	7.28	7.49	7.38	7.48
• TOC	1	1	1	1
• Arsenic	0.007	0.008	0.008	0.008
• Chromium	0.007	0.010	0.009	0.005
• Selenium	< 0.05[1]	< 0.05[1]	< 0.05[1]	< 0.05[1]
• Lead	< 0.005	< 0.005	< 0.005	< 0.005
• Total Phenolics	< 0.005	< 0.005	< 0.005	< 0.005
• Benzene (μg/L)	< 1.0	< 1.0	< 1.0	< 1.0
• Toluene (μg/L)	< 1.0	< 1.0	< 1.0	< 1.0
Other Parameters				
• Specific Conductance (μmho/cm)	348	345	346	334
• TDS	551	550	562	566

SUMMARY OF RESULTS FROM ANALYSIS OF SITE H LTU SHALLOW WELL GROUND-WATER SAMPLES THIRD QUARTERLY EVENT -- JANUARY 1993

- MW-52 (upgradient)

Constituent (mg/L)	Sample #1	Sample #2	Sample #3	Sample #4
Water Quality Parameters				
• Ammonia	< 0.05	< 0.05	< 0.05	< 0.05
• Bicarbonate	176	176	178	180
• Calcium	149	152	143	151
• Chloride	172	174	172	168
• Magnesium	24	25	25	25
• Nitrate	1.55	1.48	1.74	1.72
• Sulfate	113	140	132	137
• Sodium	40	45	48	40
Detection Monitoring Parameters				
• pH (std units)	6.87	7.22	7.10	7.17
• TOC	1	1	1	1
• Arsenic	0.009	0.013	0.014	0.006
• Chromium	< 0.01	< 0.01	< 0.01	< 0.01
• Selenium	< 0.05[1]	< 0.05[1]	< 0.05[1]	< 0.05[1]
• Lead	< 0.005	< 0.005	< 0.005	< 0.005
• Total Phenolics	< 0.005	< 0.005	< 0.005	< 0.005
• Benzene (μg/L)	< 1.0	< 1.0	< 1.0	< 1.0
• Toluene (μg/L)	< 1.0	< 1.0	< 1.0	< 1.0
Other Parameters				
• Specific Conductance (μmho/cm)	910	1,920	1,980	1,630
• TDS	749	702	712	717

SUMMARY OF RESULTS FROM ANALYSIS OF SITE H LTU SHALLOW WELL GROUND-WATER SAMPLES THIRD QUARTERLY EVENT -- JANUARY 1993

- **MW-76 (upgradient)**

Constituent (mg/L)	Sample #1	Sample #2	Sample #3	Sample #4
Water Quality Parameters				
• Ammonia	< 0.05	< 0.05	< 0.05	0.06
• Bicarbonate	186	184	184	182
• Calcium	67	96	101	106
• Chloride	104	106	108	114
• Magnesium	8	13	12	14
• Nitrate	1.38	1.57	1.72	1.61
• Sulfate	71	79	83	88
• Sodium	50	50	50	60
Detection Monitoring Parameters				
• pH (std units)	7.25	7.30	7.09	7.12
• TOC	1	1	1	1
• Arsenic	0.008	0.012	0.011	< 0.008[1]
• Chromium	< 0.01	< 0.01	0.04	0.03
• Selenium	< 0.05[1]	< 0.05[1]	< 0.05[1]	< 0.05[1]
• Lead	< 0.005	< 0.005	< 0.005	< 0.005
• Total Phenolics	< 0.005	< 0.005	< 0.005	< 0.005
• Benzene (μg/L)	< 1.0	< 1.0	< 1.0	< 1.0
• Toluene (μg/L)	< 1.0	< 1.0	< 1.0	< 1.0
Other Parameters				
• Specific Conductance (μmho/cm)	1,220	2,740	2,210	2,530
• TDS	510	511	534	546

SUMMARY OF RESULTS FROM ANALYSIS OF SITE H LTU SHALLOW WELL GROUND-WATER SAMPLES FOURTH QUARTERLY EVENT (YEAR 1) -- APRIL 1993

- MW-52 (upgradient)

Constituent (mg/L)	Sample #1	Sample #2	Sample #3	Sample #4
Water Quality Parameters				
• Ammonia	0.05	< 0.05	< 0.05	< 0.05
• Bicarbonate	178	178	174	178
• Calcium	117	127	112	127
• Chloride	160	166	156	160
• Magnesium	19.2	20.8	18.4	20.7
• Nitrate	1.74	1.81	1.52	1.14
• Sulfate	95	100	114	120
• Sodium	34.5	38	35.5	39.7
Detection Monitoring Parameters				
• pH (std units)	8.04	7.28	7.55	7.38
• TOC	1	1	1	1
• Arsenic	0.012	0.007	<0.005	0.013
• Chromium	< 0.01	< 0.01	< 0.01	< 0.01
• Selenium	< 0.05[1]	< 0.05[1]	< 0.05[1]	< 0.05[1]
• Lead	< 0.004	< 0.004	< 0.004	< 0.004
• Total Phenolics	0.01	0.02	0.01	0.01
• Benzene (μg/L)	< 1.0	< 1.0	< 1.0	< 1.0
• Toluene (μg/L)	< 1.0	< 1.0	< 1.0	< 1.0
Other Parameters				
• Specific Conductance (μmho/cm)	1,000	860	960	960
• TDS	833	725	774	703

SUMMARY OF RESULTS FROM ANALYSIS OF SITE H LTU SHALLOW WELL GROUND-WATER SAMPLES FOURTH QUARTERLY EVENT (YEAR 1) -- APRIL 1993

- **MW-76 (upgradient)**

Constituent (mg/L)	Sample #1	Sample #2	Sample #3	Sample #4
Water Quality Parameters				
• Ammonia	< 0.05	< 0.05	< 0.05	< 0.05
• Bicarbonate	184	182	178	174
• Calcium	83.4	83	86.8	91.5
• Chloride	90	90	100	174
• Magnesium	9.7	9.7	9.2	8.8
• Nitrate	1.84	1.62	1.51	1.33
• Sulfate	57	71	75	72
• Sodium	49.2	48.7	50.1	48.4
Detection Monitoring Parameters				
• pH (std units)	8.14	7.22	7.78	7.42
• TOC	1	1	1	2
• Arsenic	< 0.005	< 0.005	< 0.005	0.013
• Chromium	< 0.01	< 0.01	0.01	0.64
• Selenium	< 0.05[1]	< 0.05[1]	< 0.05[1]	< 0.05[1]
• Lead	< 0.004	< 0.004	< 0.004	< 0.004
• Total Phenolics	0.01	0.01	< 0.01	< 0.01
• Benzene (μg/L)	< 1.0	< 1.0	< 1.0	< 1.0
• Toluene (μg/L)	< 1.0	< 1.0	< 1.0	< 1.0
Other Parameters				
• Specific Conductance (μmho/cm)	760	670	660	770
• TDS	545	518	579	568

SUMMARY OF RESULTS FROM ANALYSIS OF SITE H LTU DEEP WELL GROUND-WATER SAMPLES FIRST QUARTERLY EVENT – JULY 1992

- **MW-52A (upgradient)**

Constituent (mg/L)	Sample #1	Sample #2	Sample #3	Sample #4
Water Quality Parameters				
• Ammonia	0.09[1]	0.04[1]	0.06[1]	0.02[1]
• Bicarbonate	200	198	200	200
• Calcium	130	140	120	150
• Chloride	102	108	104	102
• Magnesium	24	25	24	26
• Nitrate	1.59	1.54	1.57	1.31
• Sulfate	97	96	98	96
• Sodium	60	50	50	60
Detection Monitoring Parameters				
• pH (std units)	7.31	NA	NA	NA
• TOC	1	1	1	1
• Arsenic	0.008	0.008	0.007	0.008
• Chromium	0.006	< 0.005	< 0.005	< 0.005
• Selenium	< 0.05	< 0.05	< 0.05	< 0.05
• Lead	< 0.005	< 0.005	< 0.005	< 0.005
• Total Phenolics	0.015	0.008	0.007	0.006
• Benzene (μg/L)	< 1.0	< 1.0	< 1.0	< 1.0
• Toluene (μg/L)	< 1.0	< 1.0	< 1.0	< 1.0
Other Parameters				
• Specific Conductance (μmho/cm)	810	NA	NA	NA
• TDS	591	584	561	575

SUMMARY OF RESULTS FROM ANALYSIS OF SITE H LTU
DEEP WELL GROUND-WATER SAMPLES
FIRST QUARTERLY EVENT -- JULY 1992

- **MW-76A (upgradient)**

Constituent (mg/L)	Sample #1	Sample #2	Sample #3	Sample #4
Water Quality Parameters				
• Ammonia	0.03[5]	0.03[5]	0.03[5]	0.03[5]
• Bicarbonate	214	212	214	214
• Calcium	63	110	62	100
• Chloride	74	74	74	74
• Magnesium	22	22	22	21
• Nitrate	1.60	1.56	1.57	1.57
• Sulfate	48	46	48	49
• Sodium	70	70	70	70
Detection Monitoring Parameters				
• pH (std units)	7.44	NA	NA	NA
• TOC	1	1	1	1
• Arsenic	0.008	0.007	0.007	0.007
• Chromium	< 0.005	< 0.005	< 0.005	< 0.005
• Selenium	< 0.05	< 0.05	< 0.05	< 0.05
• Lead	< 0.005	< 0.005	< 0.005	< 0.005
• Total Phenolics	0.013	0.006	0.003	< 0.001
• Benzene (μg/L)	< 1.0	< 1.0	< 1.0	< 1.0
• Toluene (μg/L)	< 1.0	< 1.0	< 1.0	< 1.0
Other Parameters				
• Specific Conductance (μmho/cm)	720	NA	NA	NA
• TDS	502	487	493	498

SUMMARY OF RESULTS FROM ANALYSIS OF SITE H LTU
DEEP WELL GROUND-WATER SAMPLES
SECOND QUARTERLY EVENT -- OCTOBER 1992

- **MW-52A (upgradient)**

Constituent (mg/L)	Sample #1	Sample #2	Sample #3	Sample #4
Water Quality Parameters				
• Ammonia	< 0.05	< 0.05	< 0.05	< 0.05
• Bicarbonate	194	196	192	194
• Calcium	99	105	102	94
• Chloride	114	118	118	118
• Magnesium	25	30	26	27
• Nitrate	1.53	1.38	1.31	1.39
• Sulfate	170	150	140	130
• Sodium	33	35	35	36
Detection Monitoring Parameters				
• pH (std units)	6.96	7.42	7.40	7.41
• TOC	1	1	1	1
• Arsenic	0.011	0.009	0.009	0.011
• Chromium	0.008	< 0.005	< 0.005	< 0.005
• Selenium	< 0.05[1]	< 0.05[1]	< 0.05[1]	< 0.05[1]
• Lead	< 0.005	< 0.005	< 0.005	< 0.005
• Total Phenolics	< 0.005	< 0.005	< 0.005	< 0.005
• Benzene (μg/L)	< 1.0	< 1.0	< 1.0	< 1.0
• Toluene (μg/L)	< 1.0	< 1.0	< 1.0	< 1.0
Other Parameters				
• Specific Conductance (μmho/cm)	374	366	361	348
• TDS	636	635	624	620

SUMMARY OF RESULTS FROM ANALYSIS OF SITE H LTU
DEEP WELL GROUND-WATER SAMPLES
SECOND QUARTERLY EVENT -- OCTOBER 1992

- MW-76A (upgradient)

Constituent (mg/L)	Sample #1	Sample #2	Sample #3	Sample #4
Water Quality Parameters				
• Ammonia	0.07[2]	< 0.05	< 0.05	< 0.05
• Bicarbonate	218	224	222	224
• Calcium	57	60	62	57
• Chloride	72	68	68	70
• Magnesium	20	25	22	22
• Nitrate	1.58	1.71	1.30	1.50
• Sulfate	50	50	46	51
• Sodium	47	48	52	53
Detection Monitoring Parameters				
• pH (std units)	7.49	7.58	7.32	7.55
• TOC	1	1	1	1
• Arsenic	0.008	0.006	0.007	0.009
• Chromium	< 0.005	0.007	< 0.005	0.005
• Selenium	< 0.05[1]	< 0.05[1]	< 0.05[1]	< 0.05[1]
• Lead	< 0.005	< 0.005	< 0.005	< 0.005
• Total Phenolics	< 0.005	< 0.005	< 0.005	< 0.005
• Benzene (μg/L)	< 1.0	< 1.0	< 1.0	< 1.0
• Toluene (μg/L)	< 1.0	< 1.0	< 1.0	< 1.0
Other Parameters				
• Specific Conductance (μmho/cm)	314	293	301	279
• TDS	460	477	477	477

SUMMARY OF RESULTS FROM ANALYSIS OF SITE H LTU
DEEP WELL GROUND-WATER SAMPLES
THIRD QUARTERLY EVENT – JANUARY 1993

- **MW-76A (upgradient)**

Constituent (mg/L)	Sample #1	Sample #2	Sample #3	Sample #4
Water Quality Parameters				
• Ammonia	< 0.05	< 0.05	< 0.05	< 0.05
• Bicarbonate	218	220	220	222
• Calcium	63	62	64	64
• Chloride	68	72	68	84
• Magnesium	24	26	26	25
• Nitrate	1.85	1.64	1.89	1.84
• Sulfate	50	54	49	60
• Sodium	50	70	60	80
Detection Monitoring Parameters				
• pH (std units)	7.27	7.40	7.20	7.32
• TOC	1	1	2	1
• Arsenic	0.010	0.011	0.007	0.006
• Chromium	< 0.01	< 0.01	< 0.01	< 0.01
• Selenium	< 0.05[1]	< 0.05[1]	< 0.05[1]	< 0.05[1]
• Lead	< 0.005	< 0.005	< 0.005	< 0.005
• Total Phenolics	0.006	< 0.005	< 0.005	< 0.005
• Benzene (μg/L)	< 1.0	< 1.0	< 1.0	< 1.0
• Toluene (μg/L)	< 1.0	< 1.0	< 1.0	< 1.0
Other Parameters				
• Specific Conductance (μmho/cm)	1,350	2,360	1,930	2,120
• TDS	471	481	471	511

SUMMARY OF RESULTS FROM ANALYSIS OF SITE H LTU
DEEP WELL GROUND-WATER SAMPLES
THIRD QUARTERLY EVENT -- JANUARY 1993

- **MW-52A (upgradient)**

Constituent (mg/L)	Sample #1	Sample #2	Sample #3	Sample #4
Water Quality Parameters				
• Ammonia	< 0.05	< 0.05	< 0.05	< 0.05
• Bicarbonate	194	196	198	200
• Calcium	133	105	103	108
• Chloride	216	126	112	112
• Magnesium	46	33	31	31
• Nitrate	1.85	1.60	1.78	1.73
• Sulfate	173	114	115	110
• Sodium	100	50	42	54
Detection Monitoring Parameters				
• pH (std units)	7.07	7.36	7.12	7.22
• TOC	2	2	1	1
• Arsenic	0.008	0.017	0.012	0.009
• Chromium	< 0.01	< 0.01	< 0.01	< 0.01
• Selenium	< 0.05[1]	< 0.05[1]	< 0.05[1]	< 0.05[1]
• Lead	< 0.005	< 0.005	< 0.005	< 0.005
• Total Phenolics	< 0.005	< 0.005	< 0.005	< 0.005
• Benzene (μg/L)	< 1.0	< 1.0	< 1.0	< 1.0
• Toluene (μg/L)	< 1.0	< 1.0	< 1.0	< 1.0
Other Parameters				
• Specific Conductance (μmho/cm)	1,150	1,220	1,760	1,690
• TDS	901	627	595	614

SUMMARY OF RESULTS FROM ANALYSIS OF SITE H LTU DEEP WELL GROUND-WATER SAMPLES FOURTH QUARTERLY EVENT (YEAR 1) -- APRIL 1993

- **MW-52A (upgradient)**

Constituent (mg/L)	Sample #1	Sample #2	Sample #3	Sample #4
Water Quality Parameters				
• Ammonia	0.08	< 0.05	< 0.05	< 0.05
• Bicarbonate	206	206	204	226
• Calcium	83.4	41.6	114	83.5
• Chloride	114	112	79.7	114
• Magnesium	23.1	11.7	22.6	23.6
• Nitrate	1.78	1.63	1.56	1.15
• Sulfate	99	81	105	100
• Sodium	49	24.9	50.2	52.4
Detection Monitoring Parameters				
• pH (std units)	8.00	7.28	7.64	7.67
• TOC	1	1	1	1
• Arsenic	0.012	< 0.005	< 0.005	0.009
• Chromium	< 0.01	< 0.01	< 0.01	< 0.01
• Selenium	< 0.05[1]	< 0.05[1]	< 0.05[1]	< 0.05[1]
• Lead	< 0.004	< 0.004	< 0.004	< 0.004
• Total Phenolics	0.02	0.01	0.02	0.03
• Benzene (μg/L)	< 1.0	< 1.0	< 1.0	< 1.0
• Toluene (μg/L)	< 1.0	< 1.0	< 1.0	< 1.0
Other Parameters				
• Specific Conductance (μmho/cm)	900	800	850	860
• TDS	740	659	671	642

SUMMARY OF RESULTS FROM ANALYSIS OF SITE H LTU
DEEP WELL GROUND-WATER SAMPLES
FOURTH QUARTERLY EVENT (YEAR 1) -- APRIL 1993

- **MW-76A (upgradient)**

Constituent (mg/L)	Sample #1	Sample #2	Sample #3	Sample #4
Water Quality Parameters				
• Ammonia	< 0.05	< 0.05	< 0.05	< 0.05
• Bicarbonate	220	218	226	218
• Calcium	58.2	40.6	51.3	49.9
• Chloride	64	66	78	64
• Magnesium	21.1	14.9	19.7	18.5
• Nitrate	1.75	1.47	0.8	1.47
• Sulfate	36	39	46	63
• Sodium	50	35.1	51.2	46.1
Detection Monitoring Parameters				
• pH (std units)	8.22	7.36	7.64	7.51
• TOC	1	1	1	1
• Arsenic	< 0.005	0.007	< 0.005	0.007
• Chromium	< 0.01	< 0.01	< 0.01	< 0.01
• Selenium	< 0.05[1]	< 0.05[1]	< 0.05[1]	< 0.05[1]
• Lead	< 0.004	< 0.004	< 0.004	< 0.004
• Total Phenolics	< 0.01	< 0.01	< 0.01	< 0.01
• Benzene (μg/L)	< 1.0	< 1.0	< 1.0	< 1.0
• Toluene (μg/L)	< 1.0	< 1.0	< 1.0	< 1.0
Other Parameters				
• Specific Conductance (μmho/cm)	660	520	600	630
• TDS	475	491	506	464

ATTACHMENT 2

SUMMARY OF BACKGROUND GROUND-WATER VALUES FOR WATER QUALITY AND DETECTION MONITORING PARAMETERS

SUMMARY OF BACKGROUND GROUND-WATER VALUES FOR WATER QUALITY AND DETECTION MONITORING PARAMETERS

- **Water Quality Parameters**

Parameter (mg/L)	Well Depth	Mean	Standard Deviation	Appropriate Statistical Evaluation Procedure	UTL[1] (LTL,UTL)[2] [UCL][3]
• Ammonia	Shallow	0.047	0.013	One-Sided Tolerance Interval	0.076
	Deep	0.049	0.013		0.079
• Bicarbonate	Shallow	179.2	5.397	One-Sided Tolerance Interval	191.1
	Deep	209.6	11.41		234.7
• Calcium	Shallow	123.8	31.03	One-Sided Tolerance Interval	192.0
	Deep	91.00	37.65		173.8
• Chloride	Shallow	140.9	32.22	One-Sided Tolerance Interval	211.8
	Deep	93.99	30.70		161.5
• Magnesium	Shallow	16.20	5.350	One-Sided Tolerance Interval	27.96
	Deep	24.38	5.855		37.25
• Nitrate	Shallow	1.563	0.220	One-Sided Tolerance Interval	2.045
	Deep	1.556	0.225		2.052
• Sodium	Shallow	49.66	10.12	One-Sided Tolerance Interval	71.91
	Deep	53.25	15.32		86.93
• Sulfate	Shallow	102.9	34.68	One-Sided Tolerance Interval	179.1
	Deep	83.09	39.84		170.7

SUMMARY OF BACKGROUND GROUND-WATER VALUES FOR WATER QUALITY AND DETECTION MONITORING PARAMETERS (continued)

• Detection Monitoring Parameters

Parameter (mg/L)	Well Depth	Mean	Standard Deviation	Appropriate Statistical Evaluation Procedure	UTL[1] (LTL,UTL)[2] [UCL][3]
• TOC	Shallow	1.031	0.177	One-Sided Tolerance Interval	1.420
	Deep	1.094	0.296		1.745
• Arsenic	Shallow	0.009	0.003	One-Sided Tolerance Interval	0.014
	Deep	0.008	0.003		0.014
• Chromium[4]	Shallow	0.009	0.007	One-Sided Tolerance Interval	0.026
	Deep	0.008	0.002		0.013
• Phenolics	Shallow	0.006	0.004	One-Sided Tolerance Interval	0.015
	Deep	0.008	0.006		0.021
• pH (std)	Shallow	7.360	0.284	Two-Sided Tolerance Interval	(6.617, 8.102)
	Deep	7.429	0.267		(6.732, 8.126)
• Lead	Shallow	<0.005	0.0	Twice the Detection Limit	[0.01]
	Deep	<0.005	0.0		[0.01]
• Selenium	Shallow	<0.05	0.0	Twice the Detection Limit	[0.10]
	Deep	<0.05	0.0		[0.10]
• Benzene (μg/L)	Shallow	<1.0	0.0	Twice the Detection Limit	[2.0]
	Deep	<1.0	0.0		[2.0]
• Toluene (μg/L)	Shallow	<1.0	0.0	Twice the Detection Limit	[2.0]
	Deep	<1.0	0.0		[2.0]

Notes:

(1) UTL = upper tolerance limit of one-sided tolerance interval.

(2) (LTL,UTL) = range of data with endpoint values equal to the lower tolerance limit and the upper tolerance limit, respectively, of two-sided tolerance interval.

(3) [UCL] = upper control limit equal to twice the average detection limit.

(4) Outlier value removed from shallow well background database for this parameter.

ATTACHMENT 3

OVERVIEW OF THE STATISTICAL METHODS PROPOSED FOR THE EVALUATION OF SITE H LTU GROUND-WATER DATA

OVERVIEW OF THE STATISTICAL METHODS PROPOSED FOR THE EVALUATION OF SITE H LTU GROUND-WATER DATA

The statistical method that is proposed to be utilized for the evaluation of the ground-water data collected from the Site H LTU for a particular monitoring parameter depends upon the distribution of the background data for that parameter. Based on the distributions of background values for the water quality and detection monitoring parameters listed in "Attachment H" of Permit HW-50140, the following statistical methods are proposed for the evaluation of the Site H LTU ground-water data:

- One-Sided Tolerance Interval: ammonia, bicarbonate, calcium, chloride, magnesium, nitrate, sodium, and sulfate (water quality parameters); total organic carbon (TOC), arsenic, chromium, and phenolics (detection monitoring parameters)

- Two-Sided Tolerance Interval: pH (detection monitoring parameter)

- Twice the Detection Limit: lead, selenium, benzene, and toluene (detection monitoring parameters)

The following discussion provides an overview of the proposed statistical methods.

- One-Sided Tolerance Interval: This statistical procedure is based on the development of an upper tolerance limit (UTL) of a normally distributed background ground-water database to which discrete comparisons of monitoring ground-water data are made. A monitoring data value that exceeds the UTL for a particular parameter would be indicative of a potential statistically significant increase over background. This method is proposed for utilization in the statistical evaluation of TOC, arsenic, chromium, and phenolics (detection monitoring parameters) semiannual monitoring data and all water quality parameters (should the results of the trend analysis warrant a statistical evaluation as specified in Provision III.J.9. of the permit).

  The "one-sided tolerance interval" statistical procedure is one of the methods presented in the referenced EPA guidance document. This method is proposed over other procedures detailed in EPA SW/530-89-026 (e.g., analysis of variance, prediction interval) based on the following rationale:

  - The statistical methodology and the evaluation of monitoring results by discrete comparison to a UTL is straightforward. Only the background database must be normally distributed in order to utilize the tolerance interval approach. On the contrary, the analysis of variance (ANOVA) procedure is tedious to conduct, must have both background and monitoring databases that are normally distributed, and becomes even more tedious when attempting to determine in which well(s) statistically significant increases occurred when the null hypothesis is rejected. The number of future sampling events (required when using a prediction interval procedure) would not be a necessary consideration when utilizing an established set of background data; and

- A large background database is already available for determining representative UTL values. The ANOVA procedure involves the comparison of upgradient and downgradient well data collected during each individual sampling event and does not utilize an established background database. The background database is sufficiently representative so that the periodic development of a new background database (as would be required when using a prediction interval procedure) would not be necessary. Since the background wells will also be evaluated using the tolerance interval approach during each semiannual event, any upgradient impacts will be readily identified.

- Two-Sided Tolerance Interval: This statistical procedure is based on the development of both a lower tolerance limit (LTL) and a UTL of a normally distributed background ground-water database to which discrete comparisons of monitoring ground-water data are made. A monitoring data value that is outside of the LTL/UTL range for a particular parameter would be indicative of a potential statistically significant change from background. This method is presented in "Normal Distribution Tolerance Limits for Stratified Random Samples" (Technometrics, February 1989, Volume 3, No. 1) and is proposed for utilization in the statistical evaluation of pH (detection monitoring parameter) semiannual monitoring data. A reprint of this article is included as Appendix 3-A.

  The "two-sided tolerance interval" statistical procedure is not presented in EPA 530/SW-89-026. Other than the ANOVA procedure, no other statistical method presented in the EPA guidance document can be used to adequately evaluate a two-sided parameter (pH). This procedure was eliminated from consideration for the same reasons as outlined in the rationale of the selection of the "one-sided tolerance interval" procedure (as discussed above). The "two-sided tolerance interval" procedure presented in the referenced article is proposed as appropriate for the evaluation of pH monitoring data.

- Twice the Detection Limit: This statistical procedure is based on the development of an upper control limit (UCL) of a background ground-water database comprised solely of values reported at less than laboratory detection limits to which discrete comparisons of monitoring ground-water data are made. A monitoring data value that exceeds the UCL for a particular parameter would be indicative of a potential statistically significant increase over background. Although this method is not formally presented in the literature, the approach is based upon the upper 95% confidence limit about the method detection limit as described in "Appendix B" of 40 CFR §136 and has been incorporated into several facility operating permits issued by the TWC. This method is proposed for utilization in the statistical evaluation of lead, selenium, benzene, and toluene (detection monitoring parameters) semiannual monitoring data.

Output from the execution of the statistical evaluation computer package that was utilized to establish the LTL, UTL, and/or UCL values from the background ground-water data collected from the Site H LTU has been included as Appendix 3-B. The ground-water analytical data obtained from the shallow and deep wells during the semiannual sampling events will be evaluated separately. However, the proposed statistical methods for the evaluation of the parameters identified above will be utilized for the analysis of both shallow and deep well data.

APPENDIX 3-A

REPRINT OF ARTICLE REGARDING THE "TWO-SIDED TOLERANCE INTERVAL" STATISTICAL PROCEDURE

Normal Distribution Tolerance Limits for Stratified Random Samples

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This article provides methods for computing tolerance limits from a stratified random sample. It is assumed that the characteristic of interest is normally distributed within each stratum and that the within-stratum variances are equal. Approximate β-expectation and β-content tolerance limits are proposed for the population. The adequacy of the proposed limits is evaluated via simulation.

KEY WORDS: Fixed-effects ANOVA; Prediction interval; Quantile.

1. INTRODUCTION

Statistical tolerance-limit procedures are methods for making inferences about a percentile or proportion of a population. The majority of these procedures assume that a simple random sample (SRS) is selected from the population. This article addresses the problem of constructing tolerance limits from a stratified random sample (STRS), assuming that the strata are normally distributed with common variance.

Two basic types of statistical tolerance limits are used. To review these two types, the case of an SRS of size n from a normally distributed population with unknown mean and variance is used. Let $\overline{X}$ and s denote the sample mean and standard deviation, F the population distribution function, and β a specified proportion. The tolerance limits for a normal distribution are of the form $\overline{X} \pm ks$, where the factor k determines the type of tolerance limit.

1.1 Tolerance Limits for a Simple Random Sample

The first basic type of tolerance limit is called either a β-expectation (Guttman 1970, chap. 3) or a mean-coverage (Aitchison and Dunsmore 1975, chap. 5) tolerance limit. Prediction interval is yet another synonym for this type of limit. For a two-sided β-expectation tolerance interval based on an SRS, the factor k is defined by

$$k = t_\alpha(n-1)(1+n^{-1})^{1/2}, \qquad (1.1)$$

where $t_\alpha(\nu)$ denotes the 100α percentile of a t distribution with ν df and $\alpha = (1+\beta)/2$. With this definition of k we have $E_{\overline{X},s}[F(\overline{X}+ks) - F(\overline{X}-ks)] = \beta$; that is, on the average, the proportion of the population covered by the interval $(\overline{X}-ks, \overline{X}+ks)$ equals β. For the one-sided upper (lower) limit, with $\alpha = \beta$, $E_{\overline{X},s}[F(\overline{X}+ks)] = \beta$ and $(E_{\overline{X},s}[1-F(\overline{X}-ks)] = \beta)$.

A second type of tolerance limit is known as a β-content (Guttman 1970, chap. 4) or guaranteed-coverage (Aitchison and Dunsmore 1975, chap. 6) tolerance limit. For an upper β-content tolerance limit,

$$\Pr_{\overline{X},s}[F(\overline{X}+ks) \geq \beta] = \gamma, \qquad (1.2)$$

where γ is a specified confidence coefficient; that is, with confidence γ, $\overline{X}+ks$ exceeds at least β of the population. Note that $\overline{X}+ks$ is also a $100\gamma\%$ upper confidence bound for the β quantile. The value of k satisfying (1.2) is

$$k = t_\gamma(n-1, \sqrt{n}z_\beta)/\sqrt{n}, \qquad (1.3)$$

where, for any $\alpha \in (0,1)$, z_α is the 100α percentile for the standard normal distribution and $t_\alpha(\nu, \lambda)$ is the 100α percentile for a noncentral t distribution with ν df and noncentrality parameter λ. The limit $\overline{X}-ks$ with k defined by (1.3) is a lower β-content tolerance limit (and, equivalently, a $100\gamma\%$ lower confidence bound for the $1-\beta$ quantile). A two-sided β-content tolerance interval is commonly defined as

$$\Pr_{\overline{X},s}[F(\overline{X}+ks) - F(\overline{X}-ks) \geq \beta] = \gamma; \qquad (1.4)$$

that is, with confidence γ we guarantee that the interval $(\overline{X}-ks, \overline{X}+ks)$ covers at least β of the population. The factor k satisfying (1.4) was first approximated by Wald and Wolfowitz (1946). Ac-

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curate tables of factors for two-sides β-content tolerance limits are now available (e.g., Odeh and Owen 1980, table 3).

Usage of β-expectation and β-content tolerance limits is analogous to the use of a point estimate versus a lower confidence bound for a parameter; that is, with (1.1), β is like a point estimate for the proportion of the population covered by the interval, whereas with (1.2) and (1.4), β is a lower limit on the proportion covered. Practitioners need to decide whether a β-expectation interval is a sufficient summary of the sample or whether a confidence statement for the tolerance interval is desirable. Note that, whenever a β-content tolerance interval is used, the mean coverage for that interval may also be computed.

1.2 Tolerance Limits for Stratified Random Samples

Aitchison and Dunsmore (1975, pp. 120–123) presented an example in which the population consisted of the simultaneous production run of four machines. They explained that normal distributions with different means but common variance provide an adequate model for the four machines' output. An STRS of 52 components was obtained with the intent of constructing tolerance limits for the lots before shipping. The data are summarized in Table 1 and used later to illustrate the procedures in Sections 2 and 3. The pooled sample variance is 3.94 based on 48 df (Bartlett's test for homogeneity of variances has $p > .50$).

Aitchison and Dunsmore (1975) computed a two-sided β-content tolerance limit for the output of Machine 1 only, using the pooled variance. They also provided formulas appropriate for computing one-sided β-content limits (p. 119) and one- or two-sided β-expectation limits (pp. 102–103) for individual strata. The results of this article will enable one to compute either approximate β-expectation or β-content tolerance limits for the entire production run. The choice between one tolerance interval for the entire population or separate intervals for the individual strata depends on the situation. If, for example, the strata represent production lots that will remain separate, then limits for the individual strata are relevant. If the lots are to be combined so that the identity of the separate lots is lost, however, one interval for the entire population is needed. This article addresses the latter situation—that is, constructing tolerance limits for a population based on STRS. Simultaneous tolerance limits for individual strata (e.g., lots) were discussed in Mee (1988a).

Table 1. Summary Statistics for Output of Four Machines

Machine	Sample size	Mean	Variance
1	13	49.36	4.80
2	13	54.02	3.15
3	13	59.75	2.87
4	13	47.77	4.83

Let L denote the number of strata, μ_i the mean for stratum i ($k = 1, \ldots, L$), and σ^2 the common within-stratum variance. The distribution function F for our population is assumed to be

$$F(x) = \sum_{i=1}^{L} p_i \Phi[(x - \mu_i)/\sigma], \qquad (1.5)$$

where p_i denotes the proportion of the population in stratum i and $\Phi(\cdot)$ is the standard normal distribution function. We denote a quantile of the population by X_β; that is, $F(X_\beta) = \beta$.

An STRS from the population will be represented as follows. Let n_i denote the sample size for stratum i and let X_{ij} denote the jth item selected from that stratum. Define the statistics $\bar{X}_i = \sum_{j=1}^{n_i} X_{ij}/n_i$ ($i = 1, \ldots, L$), $\bar{X} = \sum_{i=1}^{L} p_i \bar{X}_i$, and $s^2 = \sum_{i=1}^{L} \sum_{j=1}^{n_i} (X_{ij} - \bar{X}_i)^2/(n - L)$, where n is the total sample size. The statistic $\bar{X}$ is normally distributed with mean $\mu = \sum_{i=1}^{L} p_i \mu_i$ and variance σ^2/n', where

$$n' = \left[\sum_{i=1}^{L} p_i^2/n_i \right]$$

Note that $n' = n$ if $n_i = p_i n$ ($i = 1, \ldots, L$) and that $n' < n$ otherwise; that is, when the strata have the same variance, proportional allocation is optimal for estimation of μ.

Section 2 presents approximate β-expectation tolerance limits for the population. Section 3 proposes a procedure for setting approximate β-content tolerance limits. We use simulation to verify the accuracy of the approximations. Finally, Section 4 contains concluding remarks regarding extension of the methods proposed in this article. The Appendix contains some mathematical details pertaining to results in Sections 2 and 3.

2. β–EXPECTATION TOLERANCE LIMITS

Atwood (1984) gave a general approach for constructing β-expectation tolerance intervals when underlying parameters must be estimated. He used a second-order Taylor series to approximate the difference between the actual expectation and the nominal expectation β. To reduce this difference, the tolerance limits proposed here will use s^2 rather than the maximum likelihood estimator for σ^2. It will be shown that the actual expectation for the proposed approximate limits is sufficiently close to β for the procedure to be useful.

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APPENDIX: DERIVATIONS

Derivation of (2.2)

We approximate $E[F(\overline{X} + \hat{Z}_\beta s)]$ using Atwood (1984, p. 461). Define $\Theta = (\mu_1, \ldots, \mu_L, \sigma^2)$, $\hat{\Theta} = (\overline{X}_1, \ldots, \overline{X}_L, s^2)$, and $\Sigma = \text{cov}(\hat{\Theta})$. Since $\hat{\Theta}$ is unbiased for Θ, we have $E[F(\overline{X} + \hat{Z}_\beta s)] \doteq \beta - .5\ \text{tr}(F_{02}\Sigma) + F_{01}^T\Sigma F_{11}/F_{10}$, where $F_{10} = \partial F/\partial x$, $F_{11} = \partial^2 F/\partial x \partial\Theta$, $F_{01} = \partial F/\partial\Theta$, and $F_{02} = \partial^2 F/\partial\Theta\partial\Theta^T$, all evaluated at X_β and Θ. The first two lines of (2.2) are obtained from $\beta - .5\ \text{tr}(F_{02}\Sigma)$, and the last term is an expression for $F_{01}^T\Sigma F_{11}/F_{10}$.

To approximate $E[F(\overline{X} + \hat{Z}_\beta cs)]$, we take (2.2) plus an approximation for the difference in mean coverage; a first-order Taylor series yields

$$F(\overline{X} + \hat{Z}_\beta cs) - F(\overline{X} + \hat{Z}_\beta s) \doteq \frac{\partial F(\overline{X} + \hat{Z}_\beta s)}{\partial x} \cdot (c - 1)\hat{Z}_\beta s. \quad \text{(A.1)}$$

We approximate the expectation of (A.1) simply by $F_{10} \cdot (c - 1)Z_\beta\sigma$, which is equivalent to (2.4).

Approximation for Variance of $[\hat{Z}_\beta s]$

The statistic $T = \hat{Z}_\beta s$ is implicitly defined by $\sum_{i=1}^{L} p_i\Phi[(T - \overline{X}_i + \overline{X})/s] = \beta$. A first-order Taylor series approximation for T is $T \doteq Z_\beta\sigma + [\partial T/\partial s^2](s^2 - \sigma^2) + \sum_{i=1}^{L}[\partial T/\partial\overline{X}_i](\overline{X}_i - \mu_i)$, where the partial derivatives are evaluated at $s^2 = \sigma^2$ and $\overline{X}_i = \mu_i$ $(i = 1, \ldots, L)$. Therefore, the variance of T/σ is approximately

$$[\partial T/\partial s^2]^2[2\sigma^2/(n - L)] + \sum_{i=1}^{L}[\partial T/\partial\overline{X}_i]^2/n_i. \quad \text{(A.2)}$$

The estimate V defined following (3.3) is obtained by evaluating (A.2) at the observed values of s^2 and $\overline{X}_1, \ldots, \overline{X}_L$.

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Two sided tolerance interval factors

* See Note n	Confidence Level 90%			Confidence Level 95%			Confidence Level 99%		
	Proportion of Population			Proportion of Population			Proportion of Population		
	.90	.95	.99	.90	.95	.99	.90	.95	.99
2	16.36	19.50	25.62	32.79	39.07	51.35	164.05	195.47	256.90
3	5.91	7.04	9.26	8.47	10.10	13.27	19.14	22.81	29.98
4	4.19	5.00	6.57	5.40	6.44	8.46	9.46	11.27	14.81
5	3.51	4.18	5.49	4.29	5.11	6.72	6.64	7.91	10.40
6	3.14	3.74	4.92	3.72	4.44	5.83	5.35	6.38	8.38
7	2.91	3.46	4.55	3.38	4.02	5.29	4.62	5.51	7.24
8	2.75	3.27	4.30	3.14	3.74	4.92	4.15	4.95	6.51
9	2.63	3.13	4.12	2.97	3.54	4.65	3.83	4.56	5.99
10	2.54	3.02	3.97	2.84	3.39	4.45	3.59	4.27	5.62
11	2.47	2.94	3.86	2.74	3.26	4.29	3.40	4.05	5.32
12	2.41	2.87	3.77	2.66	3.17	4.16	3.25	3.88	5.09
13	2.36	2.81	3.69	2.59	3.08	4.05	3.13	3.73	4.90
14	2.31	2.76	3.62	2.53	3.02	3.96	3.03	3.61	4.75
15	2.28	2.72	3.57	2.48	2.96	3.89	2.95	3.51	4.61
16	2.25	2.68	3.52	2.44	2.91	3.82	2.87	3.42	4.50
17	2.22	2.64	3.48	2.40	2.86	3.76	2.81	3.35	4.40
18	2.19	2.62	3.44	2.37	2.82	3.71	2.75	3.28	4.31
19	2.17	2.59	3.40	2.34	2.78	3.66	2.70	3.22	4.23
20	2.15	2.57	3.37	2.31	2.75	3.62	2.66	3.17	4.17
21	2.14	2.54	3.34	2.29	2.72	3.58	2.62	3.12	4.10
22	2.12	2.52	3.32	2.26	2.70	3.55	2.58	3.08	4.05
23	2.10	2.51	3.29	2.24	2.67	3.51	2.55	3.04	4.00
24	2.09	2.49	3.27	2.23	2.65	3.49	2.52	3.01	3.95
25	2.08	2.48	3.25	2.21	2.63	3.46	2.49	2.97	3.91
26	2.07	2.46	3.23	2.19	2.61	3.43	2.47	2.94	3.87
27	2.05	2.45	3.22	2.18	2.60	3.41	2.45	2.91	3.83
28	2.04	2.44	3.20	2.16	2.58	3.39	2.42	2.89	3.80
29	2.03	2.42	3.19	2.15	2.56	3.37	2.40	2.86	3.76
30	2.03	2.41	3.17	2.14	2.55	3.35	2.39	2.84	3.73
31	2.02	2.40	3.16	2.13	2.54	3.33	2.37	2.82	3.71
32	2.01	2.39	3.15	2.12	2.52	3.32	2.35	2.80	3.68
33	2.00	2.38	3.13	2.11	2.51	3.30	2.34	2.78	3.66
34	1.99	2.38	3.12	2.10	2.50	3.29	2.32	2.76	3.63
35	1.99	2.37	3.11	2.09	2.49	3.27	2.31	2.75	3.61
36	1.98	2.36	3.10	2.08	2.48	3.26	2.29	2.73	3.59
37	1.98	2.35	3.09	2.07	2.47	3.25	2.28	2.72	3.57
38	1.97	2.35	3.08	2.07	2.46	3.24	2.27	2.70	3.55
39	1.96	2.34	3.08	2.06	2.45	3.22	2.26	2.69	3.54
40	1.96	2.33	3.07	2.05	2.44	3.21	2.25	2.68	3.52
41	1.95	2.33	3.06	2.05	2.44	3.20	2.24	2.67	3.50
42	1.95	2.32	3.05	2.04	2.43	3.19	2.23	2.65	3.49
43	1.94	2.32	3.04	2.03	2.42	3.18	2.22	2.64	3.47
44	1.94	2.31	3.04	2.03	2.42	3.17	2.21	2.63	3.46
45	1.94	2.31	3.03	2.02	2.41	3.17	2.20	2.62	3.45
46	1.93	2.30	3.02	2.02	2.40	3.16	2.19	2.61	3.43
47	1.93	2.30	3.02	2.01	2.40	3.15	2.18	2.60	3.42
48	1.92	2.29	3.01	2.01	2.39	3.14	2.18	2.59	3.41
49	1.92	2.29	3.01	2.00	2.38	3.13	2.17	2.58	3.40
50	1.92	2.28	3.00	2.00	2.38	3.13	2.16	2.58	3.32

* Note: n is the number of observations used to calculate $\bar{x}$ and s.

APPENDIX 3-B

COMPUTER OUTPUT FROM THE EXECUTION OF STATISTICAL EVALUATION COMPUTER PACKAGE FOR THE DETERMINATION OF LTL, UTL, AND/OR UCL VALUES

WATER QUALITY PARAMETERS

```
**********************************************
*                                            *
*      STATISTICAL EVALUATION PACKAGE        *
*                                            *
*     *  One-Sided Tolerance Interval        *
*                                            *
*       Jones and Neuse, Inc. (1990)         *
*                                            *
**********************************************
```

Shallow Well BG Data for Site H LTU -- Ammonia (mg/L) <nh3.bgs>

Columns/Rows 2 32
n1 32
n2 0

Background ID	Monitoring ID	Background Data	Monitoring Data
		[<][-------.----]	[<][-------.----]
MW-52	1Jul92	1 .01	
MW-52	2Jul92	0 .03	
MW-52	3Jul92	1 .01	
MW-52	4Jul92	0 .01	
MW-76	1Jul92	0 .05	
MW-76	2Jul92	0 .07	
MW-76	3Jul92	0 .04	
MW-76	4Jul92	0 .06	
MW-52	1Oct92	1 .05	
MW-52	2Oct92	1 .05	
MW-52	3Oct92	1 .05	
MW-52	4Oct92	1 .05	
MW-76	1Oct92	1 .05	
MW-76	2Oct92	1 .05	
MW-76	3Oct92	1 .05	
MW-76	4Oct92	1 .05	
MW-52	1Jan93	1 .05	
MW-52	2Jan93	1 .05	
MW-52	3Jan93	1 .05	
MW-52	4Jan93	1 .05	
MW-76	1Jan93	1 .05	
MW-76	2Jan93	1 .05	
MW-76	3Jan93	1 .05	
MW-76	4Jan93	0 .06	
MW-52	1Apr93	0 .05	
MW-52	2Apr93	1 .05	
MW-52	3Apr93	1 .05	
MW-52	4Apr93	1 .05	
MW-76	1Apr93	1 .05	
MW-76	2Apr93	1 .05	
MW-76	3Apr93	1 .05	
MW-76	4Apr93	1 .05	

Statistical Data for Background Samples

Number of samples = 32
Mean = .04656 (mg/L)
Variance = .00018 $(mg/L)^2$
Standard deviation = .01335 (mg/L)
Coefficient of variation = .28663

Significance level for analysis = .050
K value from table = 2.19800
Upper limit of tolerance interval (UTL) = .07590 (mg/L)

>>> TOLERANCE INTERVAL = (0, .076) <<<

```
*****************************************
*                                       *
*     STATISTICAL EVALUATION PACKAGE    *
*                                       *
*    *  One-Sided Tolerance Interval     *
*                                       *
*      Jones and Neuse, Inc. (1990)     *
*                                       *
*****************************************
```

Deep Well BG Data for Site H LTU -- Ammonia (mg/L) <nh3.bgd>

Columns/Rows 2 32
n1 32
n2 0

Background ID	Monitoring ID	Background Data	Monitoring Data
		[<][-------.----]	[<][-------.----]
MW-52A 1Jul92		0 .09	
MW-52A 2Jul92		0 .04	
MW-52A 3Jul92		0 .06	
MW-52A 4Jul92		0 .02	
MW-76A 1Jul92		0 .03	
MW-76A 2Jul92		0 .03	
MW-76A 3Jul92		0 .03	
MW-76A 4Jul92		0 .03	
MW-52A 1Oct92		1 .05	
MW-52A 2Oct92		1 .05	
MW-52A 3Oct92		1 .05	
MW-52A 4Oct92		1 .05	
MW-76A 1Oct92		0 .07	
MW-76A 2Oct92		1 .05	
MW-76A 3Oct92		1 .05	
MW-76A 4Oct92		1 .05	
MW-52A 1Jan93		1 .05	
MW-52A 2Jan93		1 .05	
MW-52A 3Jan93		1 .05	
MW-52A 4Jan93		1 .05	
MW-76A 1Jan93		1 .05	
MW-76A 2Jan93		1 .05	
MW-76A 3Jan93		1 .05	
MW-76A 4Jan93		1 .05	
MW-52A 1Apr93		0 .08	
MW-52A 2Apr93		1 .05	
MW-52A 3Apr93		1 .05	
MW-52A 4Apr93		1 .05	
MW-76A 1Apr93		1 .05	
MW-76A 2Apr93		1 .05	
MW-76A 3Apr93		1 .05	
MW-76A 4Apr93		1 .05	

Statistical Data for Background Samples

Number of samples = 32
Mean = .04937 (mg/L)
Variance = .00018 $(mg/L)^2$
Standard deviation = .01343 (mg/L)
Coefficient of variation = .27191

Significance level for analysis = .050
K value from table = 2.19800
Upper limit of tolerance interval (UTL) = .07888 (mg/L)

>>> TOLERANCE INTERVAL = (0, .079) <<<

```
*****************************************
*                                       *
*     STATISTICAL EVALUATION PACKAGE    *
*                                       *
*    *  One-Sided Tolerance Interval     *
*                                       *
*      Jones and Neuse, Inc. (1990)     *
*                                       *
*****************************************
```

Shallow Well BG Data for Site H LTU -- Bicarbonate (mg/L) <bc.bgs>

Columns/Rows 2 32
n1 32
n2 0

Background ID	Monitoring ID	Background Data [<]	Background Data	Monitoring Data [<]	Monitoring Data
MW-52	1Jul92	0	176.0		
MW-52	2Jul92	0	174.0		
MW-52	3Jul92	0	176.0		
MW-52	4Jul92	0	176.0		
MW-76	1Jul92	0	180.0		
MW-76	2Jul92	0	200.0		
MW-76	3Jul92	0	184.0		
MW-76	4Jul92	0	182.0		
MW-52	1Oct92	0	172.0		
MW-52	2Oct92	0	172.0		
MW-52	3Oct92	0	176.0		
MW-52	4Oct92	0	174.0		
MW-76	1Oct92	0	180.0		
MW-76	2Oct92	0	182.0		
MW-76	3Oct92	0	182.0		
MW-76	4Oct92	0	176.0		
MW-52	1Jan93	0	176.0		
MW-52	2Jan93	0	176.0		
MW-52	3Jan93	0	178.0		
MW-52	4Jan93	0	180.0		
MW-76	1Jan93	0	186.0		
MW-76	2Jan93	0	184.0		
MW-76	3Jan93	0	184.0		
MW-76	4Jan93	0	182.0		
MW-52	1Apr93	0	178.0		
MW-52	2Apr93	0	178.0		
MW-52	3Apr93	0	174.0		
MW-52	4Apr93	0	178.0		
MW-76	1Apr93	0	184.0		
MW-76	2Apr93	0	182.0		
MW-76	3Apr93	0	178.0		
MW-76	4Apr93	0	174.0		

Statistical Data for Background Samples

Number of samples = 32
Mean = 179.18750 (mg/L)
Variance = 29.12500 $(mg/L)^2$
Standard deviation = 5.39676 (mg/L)
Coefficient of variation = .03012

Significance level for analysis = .050
K value from table = 2.19800
Upper limit of tolerance interval (UTL) = 191.04960 (mg/L)

>>> TOLERANCE INTERVAL = (0, 191.050) <<<

```
*****************************************
*                                       *
*     STATISTICAL EVALUATION PACKAGE    *
*                                       *
*    *  One-Sided Tolerance Interval     *
*                                       *
*      Jones and Neuse, Inc. (1990)     *
*                                       *
*****************************************
```

Deep Well BG Data for Site H LTU -- Bicarbonate (mg/L) <bc.bgd>

Columns/Rows 2 32
n1 32
n2 0

Background ID	Monitoring ID	Background Data	Monitoring Data
		[<][-------.----]	[<][-------.----]
MW-52A 1Jul92		0 200.0	
MW-52A 2Jul92		0 198.0	
MW-52A 3Jul92		0 200.0	
MW-52A 4Jul92		0 200.0	
MW-76A 1Jul92		0 214.0	
MW-76A 2Jul92		0 212.0	
MW-76A 3Jul92		0 214.0	
MW-76A 4Jul92		0 214.0	
MW-52A 1Oct92		0 194.0	
MW-52A 2Oct92		0 196.0	
MW-52A 3Oct92		0 192.0	
MW-52A 4Oct92		0 194.0	
MW-76A 1Oct92		0 218.0	
MW-76A 2Oct92		0 224.0	
MW-76A 3Oct92		0 222.0	
MW-76A 4Oct92		0 224.0	
MW-52A 1Jan93		0 218.0	
MW-52A 2Jan93		0 220.0	
MW-52A 3Jan93		0 220.0	
MW-52A 4Jan93		0 222.0	
MW-76A 1Jan93		0 194.0	
MW-76A 2Jan93		0 196.0	
MW-76A 3Jan93		0 198.0	
MW-76A 4Jan93		0 200.0	
MW-52A 1Apr93		0 206.0	
MW-52A 2Apr93		0 206.0	
MW-52A 3Apr93		0 204.0	
MW-52A 4Apr93		0 226.0	
MW-76A 1Apr93		0 220.0	
MW-76A 2Apr93		0 218.0	
MW-76A 3Apr93		0 226.0	
MW-76A 4Apr93		0 218.0	

Statistical Data for Background Samples

Number of samples = 32
Mean = 209.62500 (mg/L)
Variance = 130.17740 $(mg/L)^2$
Standard deviation = 11.40953 (mg/L)
Coefficient of variation = .05443

Significance level for analysis = .050
K value from table = 2.19800
Upper limit of tolerance interval (UTL) = 234.70320 (mg/L)

>>> TOLERANCE INTERVAL = (0, 234.703) <<<

```
*****************************************
*                                       *
*     STATISTICAL EVALUATION PACKAGE    *
*                                       *
*    *  One-Sided Tolerance Interval     *
*                                       *
*      Jones and Neuse, Inc. (1990)     *
*                                       *
*****************************************
```

Shallow Well BG Data for Site H LTU -- Calcium (mg/L) <ca.bgs>

Columns/Rows 2 32
n1 32
n2 0

Background ID	Monitoring ID	Background Data [<]	Background Data [-------.----]	Monitoring Data [<]	Monitoring Data [-------.----]
MW-52 1Jul92		0	170.0		
MW-52 2Jul92		0	170.0		
MW-52 3Jul92		0	180.0		
MW-52 4Jul92		0	170.0		
MW-76 1Jul92		0	120.0		
MW-76 2Jul92		0	130.0		
MW-76 3Jul92		0	150.0		
MW-76 4Jul92		0	140.0		
MW-52 1Oct92		0	148.0		
MW-52 2Oct92		0	146.0		
MW-52 3Oct92		0	146.0		
MW-52 4Oct92		0	133.0		
MW-76 1Oct92		0	84.0		
MW-76 2Oct92		0	91.0		
MW-76 3Oct92		0	92.0		
MW-76 4Oct92		0	98.0		
MW-52 1Jan93		0	149.0		
MW-52 2Jan93		0	152.0		
MW-52 3Jan93		0	143.0		
MW-52 4Jan93		0	151.0		
MW-76 1Jan93		0	67.0		
MW-76 2Jan93		0	96.0		
MW-76 3Jan93		0	101.0		
MW-76 4Jan93		0	106.0		
MW-52 1Apr93		0	117.0		
MW-52 2Apr93		0	127.0		
MW-52 3Apr93		0	112.0		
MW-52 4Apr93		0	127.0		
MW-76 1Apr93		0	83.4		
MW-76 2Apr93		0	83.0		
MW-76 3Apr93		0	86.8		
MW-76 4Apr93		0	91.5		

Statistical Data for Background Samples

Number of samples = 32
Mean = 123.77190 (mg/L)
Variance = 962.76730 $(mg/L)^2$
Standard deviation = 31.02849 (mg/L)
Coefficient of variation = .25069

Significance level for analysis = .050
K value from table = 2.19800
Upper limit of tolerance interval (UTL) = 191.97250 (mg/L)

>>> TOLERANCE INTERVAL = (0, 191.973) <<<

```
*****************************************
*                                       *
*     STATISTICAL EVALUATION PACKAGE    *
*                                       *
*    *  One-Sided Tolerance Interval     *
*                                       *
*      Jones and Neuse, Inc. (1990)     *
*                                       *
*****************************************
```

Deep Well BG Data for Site H LTU -- Calcium (mg/L) <ca.bgd>

Columns/Rows 2 32
n1 32
n2 0

Background ID	Monitoring ID	Background Data [<]	Background Data	Monitoring Data [<]	Monitoring Data
MW-52A 1Jul92		0	130.0		
MW-52A 2Jul92		0	140.0		
MW-52A 3Jul92		0	120.0		
MW-52A 4Jul92		0	150.0		
MW-76A 1Jul92		0	63.0		
MW-76A 2Jul92		0	110.0		
MW-76A 3Jul92		0	62.0		
MW-76A 4Jul92		0	100.0		
MW-52A 1Oct92		0	99.0		
MW-52A 2Oct92		0	105.0		
MW-52A 3Oct92		0	102.0		
MW-52A 4Oct92		0	94.0		
MW-76A 1Oct92		0	57.0		
MW-76A 2Oct92		0	60.0		
MW-76A 3Oct92		0	62.0		
MW-76A 4Oct92		0	57.0		
MW-52A 1Jan93		0	63.0		
MW-52A 2Jan93		0	62.0		
MW-52A 3Jan93		0	64.0		
MW-52A 4Jan93		0	64.0		
MW-76A 1Jan93		0	133.0		
MW-76A 2Jan93		0	105.0		
MW-76A 3Jan93		0	103.0		
MW-76A 4Jan93		0	108.0		
MW-52A 1Apr93		0	83.4		
MW-52A 2Apr93		0	114.0		
MW-52A 3Apr93		0	83.5		
MW-52A 4Apr93		0	58.2		
MW-76A 1Apr93		0	40.6		
MW-76A 2Apr93		0	51.3		
MW-76A 3Apr93		0	49.9		
MW-76A 4Apr93		0	218.0		

Statistical Data for Background Samples

Number of samples = 32
Mean = 90.99687 (mg/L)
Variance = 1417.55800 $(mg/L)^2$
Standard deviation = 37.65048 (mg/L)
Coefficient of variation = .41376

Significance level for analysis = .050
K value from table = 2.19800
Upper limit of tolerance interval (UTL) = 173.75260 (mg/L)

>>> TOLERANCE INTERVAL = (0, 173.753) <<<

```
*****************************************
*                                       *
*     STATISTICAL EVALUATION PACKAGE    *
*                                       *
*    *  One-Sided Tolerance Interval     *
*                                       *
*      Jones and Neuse, Inc. (1990)     *
*                                       *
*****************************************
```

Shallow Well BG Data for Site H LTU -- Chloride (mg/L) <cl.bgs>

Columns/Rows 2 32
n1 32
n2 0

Background ID	Monitoring ID	Background Data		Monitoring Data	
		[<]	[-------.----]	[<]	[-------.----]
MW-52	1Jul92	0	172.0		
MW-52	2Jul92	0	170.0		
MW-52	3Jul92	0	174.0		
MW-52	4Jul92	0	170.0		
MW-76	1Jul92	0	110.0		
MW-76	2Jul92	0	108.0		
MW-76	3Jul92	0	110.0		
MW-76	4Jul92	0	112.0		
MW-52	1Oct92	0	174.0		
MW-52	2Oct92	0	176.0		
MW-52	3Oct92	0	178.0		
MW-52	4Oct92	0	172.0		
MW-76	1Oct92	0	114.0		
MW-76	2Oct92	0	116.0		
MW-76	3Oct92	0	116.0		
MW-76	4Oct92	0	124.0		
MW-52	1Jan93	0	172.0		
MW-52	2Jan93	0	174.0		
MW-52	3Jan93	0	172.0		
MW-52	4Jan93	0	168.0		
MW-76	1Jan93	0	104.0		
MW-76	2Jan93	0	106.0		
MW-76	3Jan93	0	108.0		
MW-76	4Jan93	0	114.0		
MW-52	1Apr93	0	160.0		
MW-52	2Apr93	0	166.0		
MW-52	3Apr93	0	156.0		
MW-52	4Apr93	0	160.0		
MW-76	1Apr93	0	90.0		
MW-76	2Apr93	0	90.0		
MW-76	3Apr93	0	100.0		
MW-76	4Apr93	0	174.0		

Statistical Data for Background Samples

Number of samples = 32
Mean = 140.93750 (mg/L)
Variance = 1038.44800 $(mg/L)^2$
Standard deviation = 32.22495 (mg/L)
Coefficient of variation = .22865

Significance level for analysis = .050
K value from table = 2.19800
Upper limit of tolerance interval (UTL) = 211.76790 (mg/L)

>>> TOLERANCE INTERVAL = (0, 211.768) <<<

```
**********************************************
*                                            *
*      STATISTICAL EVALUATION PACKAGE        *
*                                            *
*     *  One-Sided Tolerance Interval        *
*                                            *
*       Jones and Neuse, Inc. (1990)         *
*                                            *
**********************************************
```

Deep Well BG Data for Site H LTU -- Chloride (mg/L) <cl.bgd>

Columns/Rows 2 32
n1 32
n2 0

Background ID	Monitoring ID	Background Data [<]	Background Data	Monitoring Data [<]	Monitoring Data
MW-52A 1Jul92		0	102.0		
MW-52A 2Jul92		0	108.0		
MW-52A 3Jul92		0	104.0		
MW-52A 4Jul92		0	102.0		
MW-76A 1Jul92		0	74.0		
MW-76A 2Jul92		0	74.0		
MW-76A 3Jul92		0	74.0		
MW-76A 4Jul92		0	74.0		
MW-52A 1Oct92		0	114.0		
MW-52A 2Oct92		0	118.0		
MW-52A 3Oct92		0	118.0		
MW-52A 4Oct92		0	118.0		
MW-76A 1Oct92		0	72.0		
MW-76A 2Oct92		0	68.0		
MW-76A 3Oct92		0	68.0		
MW-76A 4Oct92		0	70.0		
MW-52A 1Jan93		0	68.0		
MW-52A 2Jan93		0	72.0		
MW-52A 3Jan93		0	68.0		
MW-52A 4Jan93		0	84.0		
MW-76A 1Jan93		0	216.0		
MW-76A 2Jan93		0	126.0		
MW-76A 3Jan93		0	112.0		
MW-76A 4Jan93		0	112.0		
MW-52A 1Apr93		0	114.0		
MW-52A 2Apr93		0	112.0		
MW-52A 3Apr93		0	79.7		
MW-52A 4Apr93		0	114.0		
MW-76A 1Apr93		0	64.0		
MW-76A 2Apr93		0	66.0		
MW-76A 3Apr93		0	78.0		
MW-76A 4Apr93		0	64.0		

Statistical Data for Background Samples

Number of samples = 32
Mean = 93.99062 (mg/L)
Variance = 942.72530 $(mg/L)^2$
Standard deviation = 30.70383 (mg/L)
Coefficient of variation = .32667

Significance level for analysis = .050
K value from table = 2.19800
Upper limit of tolerance interval (UTL) = 161.47760 (mg/L)

>>> TOLERANCE INTERVAL = (0, 161.478) <<<

```
**********************************************
*                                            *
*      STATISTICAL EVALUATION PACKAGE        *
*                                            *
*     *  One-Sided Tolerance Interval        *
*                                            *
*       Jones and Neuse, Inc. (1990)         *
*                                            *
**********************************************
```

Shallow Well BG Data for Site H LTU -- Magnesium (mg/L) <mg.bgs>

Columns/Rows 2 32
n1 32
n2 0

Background ID		Monitoring ID	Background Data [<]	Background Data	Monitoring Data [<]	Monitoring Data
MW-52	1Jul92		0	20.0		
MW-52	2Jul92		0	19.0		
MW-52	3Jul92		0	20.0		
MW-52	4Jul92		0	21.0		
MW-76	1Jul92		0	14.0		
MW-76	2Jul92		0	13.0		
MW-76	3Jul92		0	13.0		
MW-76	4Jul92		0	13.0		
MW-52	1Oct92		0	18.0		
MW-52	2Oct92		0	22.0		
MW-52	3Oct92		0	18.0		
MW-52	4Oct92		0	20.0		
MW-76	1Oct92		0	10.0		
MW-76	2Oct92		0	12.0		
MW-76	3Oct92		0	11.0		
MW-76	4Oct92		0	12.0		
MW-52	1Jan93		0	24.0		
MW-52	2Jan93		0	25.0		
MW-52	3Jan93		0	25.0		
MW-52	4Jan93		0	25.0		
MW-76	1Jan93		0	8.0		
MW-76	2Jan93		0	13.0		
MW-76	3Jan93		0	12.0		
MW-76	4Jan93		0	14.0		
MW-52	1Apr93		0	19.2		
MW-52	2Apr93		0	20.8		
MW-52	3Apr93		0	18.4		
MW-52	4Apr93		0	20.7		
MW-76	1Apr93		0	9.7		
MW-76	2Apr93		0	9.7		
MW-76	3Apr93		0	9.2		
MW-76	4Apr93		0	8.8		

Statistical Data for Background Samples

Number of samples = 32
Mean = 16.20313 (mg/L)
Variance = 28.62160 $(mg/L)^2$
Standard deviation = 5.34992 (mg/L)
Coefficient of variation = .33018

Significance level for analysis = .050
K value from table = 2.19800
Upper limit of tolerance interval (UTL) = 27.96224 (mg/L)

>>> TOLERANCE INTERVAL = (0, 27.962) <<<

```
*****************************************
*                                       *
*     STATISTICAL EVALUATION PACKAGE    *
*                                       *
*     *  One-Sided Tolerance Interval   *
*                                       *
*      Jones and Neuse, Inc. (1990)     *
*                                       *
*****************************************
```

Deep Well BG Data for Site H LTU -- Magnesium (mg/L) <mg.bgd>

Columns/Rows 2 32
n1 32
n2 0

Background ID	Monitoring ID	Background Data [<]	Background Data	Monitoring Data [<]	Monitoring Data
MW-52A 1Jul92		0	24.0		
MW-52A 2Jul92		0	25.0		
MW-52A 3Jul92		0	24.0		
MW-52A 4Jul92		0	26.0		
MW-76A 1Jul92		0	22.0		
MW-76A 2Jul92		0	22.0		
MW-76A 3Jul92		0	22.0		
MW-76A 4Jul92		0	21.0		
MW-52A 1Oct92		0	25.0		
MW-52A 2Oct92		0	30.0		
MW-52A 3Oct92		0	26.0		
MW-52A 4Oct92		0	27.0		
MW-76A 1Oct92		0	20.0		
MW-76A 2Oct92		0	25.0		
MW-76A 3Oct92		0	22.0		
MW-76A 4Oct92		0	22.0		
MW-52A 1Jan93		0	24.0		
MW-52A 2Jan93		0	26.0		
MW-52A 3Jan93		0	26.0		
MW-52A 4Jan93		0	25.0		
MW-76A 1Jan93		0	46.0		
MW-76A 2Jan93		0	33.0		
MW-76A 3Jan93		0	31.0		
MW-76A 4Jan93		0	31.0		
MW-52A 1Apr93		0	23.1		
MW-52A 2Apr93		0	11.7		
MW-52A 3Apr93		0	22.6		
MW-52A 4Apr93		0	23.6		
MW-76A 1Apr93		0	21.1		
MW-76A 2Apr93		0	14.9		
MW-76A 3Apr93		0	19.7		
MW-76A 4Apr93		0	18.5		

Statistical Data for Background Samples

Number of samples = 32
Mean = 24.38125 (mg/L)
Variance = 34.27512 $(mg/L)^2$
Standard deviation = 5.85450 (mg/L)
Coefficient of variation = .24012

Significance level for analysis = .050
K value from table = 2.19800
Upper limit of tolerance interval (UTL) = 37.24943 (mg/L)

>>> TOLERANCE INTERVAL = (0, 37.249) <<<

```
*****************************************
*                                       *
*     STATISTICAL EVALUATION PACKAGE    *
*                                       *
*    *  One-Sided Tolerance Interval     *
*                                       *
*      Jones and Neuse, Inc. (1990)     *
*                                       *
*****************************************
```

Shallow Well BG Data for Site H LTU -- Nitrate (mg/L) <no3.bgs>

Columns/Rows 2 32
n1 32
n2 0

Background ID	Monitoring ID	Background Data [<]	Background Data	Monitoring Data [<]	Monitoring Data
MW-52	1Jul92	0	1.92		
MW-52	2Jul92	0	1.82		
MW-52	3Jul92	0	1.89		
MW-52	4Jul92	0	1.74		
MW-76	1Jul92	0	1.46		
MW-76	2Jul92	0	1.41		
MW-76	3Jul92	0	1.27		
MW-76	4Jul92	0	1.25		
MW-52	1Oct92	0	1.58		
MW-52	2Oct92	0	1.52		
MW-52	3Oct92	0	1.30		
MW-52	4Oct92	0	1.80		
MW-76	1Oct92	0	1.68		
MW-76	2Oct92	0	1.68		
MW-76	3Oct92	0	1.20		
MW-76	4Oct92	0	1.21		
MW-52	1Jan93	0	1.55		
MW-52	2Jan93	0	1.48		
MW-52	3Jan93	0	1.74		
MW-52	4Jan93	0	1.72		
MW-76	1Jan93	0	1.38		
MW-76	2Jan93	0	1.57		
MW-76	3Jan93	0	1.72		
MW-76	4Jan93	0	1.61		
MW-52	1Apr93	0	1.74		
MW-52	2Apr93	0	1.81		
MW-52	3Apr93	0	1.52		
MW-52	4Apr93	0	1.14		
MW-76	1Apr93	0	1.84		
MW-76	2Apr93	0	1.62		
MW-76	3Apr93	0	1.51		
MW-76	4Apr93	0	1.33		

Statistical Data for Background Samples

Number of samples	=	32
Mean	=	1.56281 (mg/L)
Variance	=	.04821 $(mg/L)^2$
Standard deviation	=	.21956 (mg/L)
Coefficient of variation	=	.14049

Significance level for analysis	=	.050
K value from table	=	2.19800
Upper limit of tolerance interval (UTL)	=	2.04541 (mg/L)

>>> TOLERANCE INTERVAL = (0, 2.045) <<<

```
*****************************************
*                                       *
*     STATISTICAL EVALUATION PACKAGE    *
*                                       *
*    *  One-Sided Tolerance Interval     *
*                                       *
*      Jones and Neuse, Inc. (1990)     *
*                                       *
*****************************************
```

Deep Well BG Data for Site H LTU -- Nitrate (mg/L) <no3.bgd>

Columns/Rows 2 32
n1 32
n2 0

Background ID	Monitoring ID	Background Data [<]	Background Data	Monitoring Data [<]	Monitoring Data
MW-52A 1Jul92		0	1.59		
MW-52A 2Jul92		0	1.54		
MW-52A 3Jul92		0	1.57		
MW-52A 4Jul92		0	1.31		
MW-76A 1Jul92		0	1.60		
MW-76A 2Jul92		0	1.56		
MW-76A 3Jul92		0	1.57		
MW-76A 4Jul92		0	1.57		
MW-52A 1Oct92		0	1.53		
MW-52A 2Oct92		0	1.38		
MW-52A 3Oct92		0	1.31		
MW-52A 4Oct92		0	1.39		
MW-76A 1Oct92		0	1.58		
MW-76A 2Oct92		0	1.71		
MW-76A 3Oct92		0	1.30		
MW-76A 4Oct92		0	1.50		
MW-52A 1Jan93		0	1.85		
MW-52A 2Jan93		0	1.64		
MW-52A 3Jan93		0	1.89		
MW-52A 4Jan93		0	1.84		
MW-76A 1Jan93		0	1.85		
MW-76A 2Jan93		0	1.60		
MW-76A 3Jan93		0	1.78		
MW-76A 4Jan93		0	1.73		
MW-52A 1Apr93		0	1.78		
MW-52A 2Apr93		0	1.63		
MW-52A 3Apr93		0	1.56		
MW-52A 4Apr93		0	1.15		
MW-76A 1Apr93		0	1.75		
MW-76A 2Apr93		0	1.47		
MW-76A 3Apr93		0	.80		
MW-76A 4Apr93		0	1.47		

Statistical Data for Background Samples

Number of samples = 32
Mean = 1.55625 (mg/L)
Variance = .05084 $(mg/L)^2$
Standard deviation = .22549 (mg/L)
Coefficient of variation = .14489

Significance level for analysis = .050
K value from table = 2.19800
Upper limit of tolerance interval (UTL) = 2.05187 (mg/L)

>>> TOLERANCE INTERVAL = (0, 2.052) <<<

```
*****************************************
*                                       *
*     STATISTICAL EVALUATION PACKAGE    *
*                                       *
*    *  One-Sided Tolerance Interval     *
*                                       *
*      Jones and Neuse, Inc. (1990)     *
*                                       *
*****************************************
```

Shallow Well BG Data for Site H LTU -- Sodium (mg/L) <na.bgs>

Columns/Rows 2 32
n1 32
n2 0

Background ID	Monitoring ID	Background Data	Monitoring Data
MW-52	1Jul92	50.0	
MW-52	2Jul92	50.0	
MW-52	3Jul92	60.0	
MW-52	4Jul92	50.0	
MW-76	1Jul92	70.0	
MW-76	2Jul92	70.0	
MW-76	3Jul92	70.0	
MW-76	4Jul92	60.0	
MW-52	1Oct92	38.0	
MW-52	2Oct92	42.0	
MW-52	3Oct92	42.0	
MW-52	4Oct92	44.0	
MW-76	1Oct92	45.0	
MW-76	2Oct92	48.0	
MW-76	3Oct92	53.0	
MW-76	4Oct92	70.0	
MW-52	1Jan93	40.0	
MW-52	2Jan93	45.0	
MW-52	3Jan93	48.0	
MW-52	4Jan93	40.0	
MW-76	1Jan93	50.0	
MW-76	2Jan93	50.0	
MW-76	3Jan93	50.0	
MW-76	4Jan93	60.0	
MW-52	1Apr93	34.5	
MW-52	2Apr93	38.0	
MW-52	3Apr93	35.5	
MW-52	4Apr93	39.7	
MW-76	1Apr93	49.2	
MW-76	2Apr93	48.7	
MW-76	3Apr93	50.1	
MW-76	4Apr93	48.4	

Statistical Data for Background Samples

Number of samples = 32
Mean = 49.65937 (mg/L)
Variance = 102.47670 $(mg/L)^2$
Standard deviation = 10.12308 (mg/L)
Coefficient of variation = .20385

Significance level for analysis = .050
K value from table = 2.19800
Upper limit of tolerance interval (UTL) = 71.90989 (mg/L)

>>> TOLERANCE INTERVAL = (0, 71.910) <<<

```
*****************************************
*                                       *
*     STATISTICAL EVALUATION PACKAGE    *
*                                       *
*    *  One-Sided Tolerance Interval     *
*                                       *
*      Jones and Neuse, Inc. (1990)     *
*                                       *
*****************************************
```

Deep Well BG Data for Site H LTU -- Sodium (mg/L) <na.bgd>

Columns/Rows 2 32
n1 32
n2 0

Background ID	Monitoring ID	Background Data [<]	Background Data	Monitoring Data [<]	Monitoring Data
MW-52A 1Jul92		0	60.0		
MW-52A 2Jul92		0	50.0		
MW-52A 3Jul92		0	50.0		
MW-52A 4Jul92		0	60.0		
MW-76A 1Jul92		0	70.0		
MW-76A 2Jul92		0	70.0		
MW-76A 3Jul92		0	70.0		
MW-76A 4Jul92		0	70.0		
MW-52A 1Oct92		0	33.0		
MW-52A 2Oct92		0	35.0		
MW-52A 3Oct92		0	35.0		
MW-52A 4Oct92		0	36.0		
MW-76A 1Oct92		0	47.0		
MW-76A 2Oct92		0	48.0		
MW-76A 3Oct92		0	52.0		
MW-76A 4Oct92		0	53.0		
MW-52A 1Jan93		0	50.0		
MW-52A 2Jan93		0	70.0		
MW-52A 3Jan93		0	60.0		
MW-52A 4Jan93		0	80.0		
MW-76A 1Jan93		0	100.0		
MW-76A 2Jan93		0	50.0		
MW-76A 3Jan93		0	42.0		
MW-76A 4Jan93		0	54.0		
MW-52A 1Apr93		0	49.1		
MW-52A 2Apr93		0	24.9		
MW-52A 3Apr93		0	50.2		
MW-52A 4Apr93		0	52.4		
MW-76A 1Apr93		0	50.0		
MW-76A 2Apr93		0	35.1		
MW-76A 3Apr93		0	51.2		
MW-76A 4Apr93		0	46.1		

Statistical Data for Background Samples

Number of samples = 32
Mean = 53.25000 (mg/L)
Variance = 234.78320 $(mg/L)^2$
Standard deviation = 15.32264 (mg/L)
Coefficient of variation = .28775

Significance level for analysis = .050
K value from table = 2.19800
Upper limit of tolerance interval (UTL) = 86.92915 (mg/L)

>>> TOLERANCE INTERVAL = (0, 86.929) <<<

```
*****************************************
*                                       *
*     STATISTICAL EVALUATION PACKAGE    *
*                                       *
*    *  One-Sided Tolerance Interval     *
*                                       *
*      Jones and Neuse, Inc. (1990)     *
*                                       *
*****************************************
```

Shallow Well BG Data for Site H LTU -- Sulfate (mg/L) <so4.bgs>

Columns/Rows 2 32
n1 32
n2 0

Background ID	Monitoring ID	Background Data [<]	Background Data	Monitoring Data [<]	Monitoring Data
MW-52	1Jul92	0	130.0		
MW-52	2Jul92	0	120.0		
MW-52	3Jul92	0	150.0		
MW-52	4Jul92	0	130.0		
MW-76	1Jul92	0	65.0		
MW-76	2Jul92	0	66.0		
MW-76	3Jul92	0	67.0		
MW-76	4Jul92	0	64.0		
MW-52	1Oct92	0	180.0		
MW-52	2Oct92	0	170.0		
MW-52	3Oct92	0	150.0		
MW-52	4Oct92	0	140.0		
MW-76	1Oct92	0	73.0		
MW-76	2Oct92	0	76.0		
MW-76	3Oct92	0	74.0		
MW-76	4Oct92	0	90.0		
MW-52	1Jan93	0	113.0		
MW-52	2Jan93	0	140.0		
MW-52	3Jan93	0	132.0		
MW-52	4Jan93	0	137.0		
MW-76	1Jan93	0	71.0		
MW-76	2Jan93	0	79.0		
MW-76	3Jan93	0	83.0		
MW-76	4Jan93	0	88.0		
MW-52	1Apr93	0	95.0		
MW-52	2Apr93	0	100.0		
MW-52	3Apr93	0	114.0		
MW-52	4Apr93	0	120.0		
MW-76	1Apr93	0	57.0		
MW-76	2Apr93	0	71.0		
MW-76	3Apr93	0	75.0		
MW-76	4Apr93	0	72.0		

Statistical Data for Background Samples

Number of samples = 32
Mean = 102.87500 (mg/L)
Variance = 1202.56500 $(mg/L)^2$
Standard deviation = 34.67801 (mg/L)
Coefficient of variation = .33709

Significance level for analysis = .050
K value from table = 2.19800
Upper limit of tolerance interval (UTL) = 179.09730 (mg/L)

>>> TOLERANCE INTERVAL = (0, 179.097) <<<

```
*****************************************
*                                       *
*     STATISTICAL EVALUATION PACKAGE    *
*                                       *
*    *  One-Sided Tolerance Interval     *
*                                       *
*      Jones and Neuse, Inc. (1990)     *
*                                       *
*****************************************
```

Deep Well BG Data for Site H LTU -- Sulfate (mg/L) <so4.bgd>

Columns/Rows 2 32
n1 32
n2 0

Background ID	Monitoring ID	Background Data		Monitoring Data	
[----------]	[----------]	[<]	[-------.----]	[<]	[-------.----]
MW-52A 1Jul92		0	97.0		
MW-52A 2Jul92		0	96.0		
MW-52A 3Jul92		0	98.0		
MW-52A 4Jul92		0	96.0		
MW-76A 1Jul92		0	48.0		
MW-76A 2Jul92		0	46.0		
MW-76A 3Jul92		0	48.0		
MW-76A 4Jul92		0	49.0		
MW-52A 1Oct92		0	170.0		
MW-52A 2Oct92		0	150.0		
MW-52A 3Oct92		0	140.0		
MW-52A 4Oct92		0	130.0		
MW-76A 1Oct92		0	50.0		
MW-76A 2Oct92		0	50.0		
MW-76A 3Oct92		0	46.0		
MW-76A 4Oct92		0	51.0		
MW-52A 1Jan93		0	50.0		
MW-52A 2Jan93		0	54.0		
MW-52A 3Jan93		0	49.0		
MW-52A 4Jan93		0	60.0		
MW-76A 1Jan93		0	173.0		
MW-76A 2Jan93		0	114.0		
MW-76A 3Jan93		0	115.0		
MW-76A 4Jan93		0	110.0		
MW-52A 1Apr93		0	99.0		
MW-52A 2Apr93		0	81.0		
MW-52A 3Apr93		0	105.0		
MW-52A 4Apr93		0	100.0		
MW-76A 1Apr93		0	36.0		
MW-76A 2Apr93		0	39.0		
MW-76A 3Apr93		0	46.0		
MW-76A 4Apr93		0	63.0		

Statistical Data for Background Samples

Number of samples = 32
Mean = 83.09375 (mg/L)
Variance = 1586.99000 $(mg/L)^2$
Standard deviation = 39.83705 (mg/L)
Coefficient of variation = .47942

Significance level for analysis = .050
K value from table = 2.19800
Upper limit of tolerance interval (UTL) = 170.65560 (mg/L)

>>> TOLERANCE INTERVAL = (0, 170.656) <<<

DETECTION MONITORING PARAMETERS

```
**********************************************
*                                            *
*      STATISTICAL EVALUATION PACKAGE        *
*                                            *
*     *  One-Sided Tolerance Interval        *
*                                            *
*       Jones and Neuse, Inc. (1990)         *
*                                            *
**********************************************

Shallow Well BG Data for Site H LTU -- TOC (mg/L)                    <toc.bgs>
Columns/Rows          2    32
n1                   32
n2                    0

 Background ID     Monitoring ID     Background Data     Monitoring Data

[-------------]   [-------------]   [<][-------.----]   [<][-------.----]

 MW-52   1Jul92                      0         1.0000
 MW-52   2Jul92                      0         1.0000
 MW-52   3Jul92                      0         1.0000
 MW-52   4Jul92                      0         1.0000
 MW-76   1Jul92                      0         1.0000
 MW-76   2Jul92                      0         1.0000
 MW-76   3Jul92                      0         1.0000
 MW-76   4Jul92                      0         1.0000
 MW-52   1Oct92                      0         1.0000
 MW-52   2Oct92                      0         1.0000
 MW-52   3Oct92                      0         1.0000
 MW-52   4Oct92                      0         1.0000
 MW-76   1Oct92                      0         1.0000
 MW-76   2Oct92                      0         1.0000
 MW-76   3Oct92                      0         1.0000
 MW-76   4Oct92                      0         1.0000
 MW-52   1Jan93                      0         1.0000
 MW-52   2Jan93                      0         1.0000
 MW-52   3Jan93                      0         1.0000
 MW-52   4Jan93                      0         1.0000
 MW-76   1Jan93                      0         1.0000
 MW-76   2Jan93                      0         1.0000
 MW-76   3Jan93                      0         1.0000
 MW-76   4Jan93                      0         1.0000
 MW-52   1Apr93                      0         1.0000
 MW-52   2Apr93                      0         1.0000
 MW-52   3Apr93                      0         1.0000
 MW-52   4Apr93                      0         1.0000
 MW-76   1Apr93                      0         1.0000
 MW-76   2Apr93                      0         1.0000
 MW-76   3Apr93                      0         1.0000
 MW-76   4Apr93                      0         2.0000

-----------------------------------------
Statistical Data for Background Samples
-----------------------------------------

Number of samples          =            32
Mean                       =       1.03125 (mg/L)
Variance                   =        .03125 (mg/L)^2
Standard deviation         =        .17678 (mg/L)
Coefficient of variation   =        .17142


Significance level for analysis          =          .050
K value from table                       =      2.19800
Upper limit of tolerance interval (UTL) =      1.41981 (mg/L)

 >>> TOLERANCE INTERVAL = (0,     1.420) <<<
```

```
*****************************************
*                                       *
*     STATISTICAL EVALUATION PACKAGE    *
*                                       *
*    *  One-Sided Tolerance Interval     *
*                                       *
*      Jones and Neuse, Inc. (1990)     *
*                                       *
*****************************************
```

Deep Well BG Data for Site H LTU -- TOC (mg/L) <toc.bgd>

Columns/Rows 2 32
n1 32
n2 0

Background ID	Monitoring ID	Background Data [<]	Background Data	Monitoring Data [<]	Monitoring Data
MW-52A 1Jul92		0	1.0000		
MW-52A 2Jul92		0	1.0000		
MW-52A 3Jul92		0	1.0000		
MW-52A 4Jul92		0	1.0000		
MW-76A 1Jul92		0	1.0000		
MW-76A 2Jul92		0	1.0000		
MW-76A 3Jul92		0	1.0000		
MW-76A 4Jul92		0	1.0000		
MW-52A 1Oct92		0	1.0000		
MW-52A 2Oct92		0	1.0000		
MW-52A 3Oct92		0	1.0000		
MW-52A 4Oct92		0	1.0000		
MW-76A 1Oct92		0	1.0000		
MW-76A 2Oct92		0	1.0000		
MW-76A 3Oct92		0	1.0000		
MW-76A 4Oct92		0	1.0000		
MW-52A 1Jan93		0	2.0000		
MW-52A 2Jan93		0	2.0000		
MW-52A 3Jan93		0	1.0000		
MW-52A 4Jan93		0	1.0000		
MW-76A 1Jan93		0	1.0000		
MW-76A 2Jan93		0	1.0000		
MW-76A 3Jan93		0	2.0000		
MW-76A 4Jan93		0	1.0000		
MW-52A 1Apr93		0	1.0000		
MW-52A 2Apr93		0	1.0000		
MW-52A 3Apr93		0	1.0000		
MW-52A 4Apr93		0	1.0000		
MW-76A 1Apr93		0	1.0000		
MW-76A 2Apr93		0	1.0000		
MW-76A 3Apr93		0	1.0000		
MW-76A 4Apr93		0	1.0000		

Statistical Data for Background Samples

Number of samples = 32
Mean = 1.09375 (mg/L)
Variance = .08770 $(mg/L)^2$
Standard deviation = .29614 (mg/L)
Coefficient of variation = .27076

Significance level for analysis = .050
K value from table = 2.19800
Upper limit of tolerance interval (UTL) = 1.74468 (mg/L)

>>> TOLERANCE INTERVAL = (0, 1.745) <<<

```
*****************************************
*                                       *
*     STATISTICAL EVALUATION PACKAGE    *
*                                       *
*    *  One-Sided Tolerance Interval     *
*                                       *
*      Jones and Neuse, Inc. (1990)     *
*                                       *
*****************************************
```

Shallow Well BG Data for Site H LTU -- Arsenic (mg/L) <as.bgs>

Columns/Rows 2 32
n1 32
n2 0

Background ID	Monitoring ID	Background Data	Monitoring Data
		[<][-------.----]	[<][-------.----]
MW-52	1Jul92	0 .0080	
MW-52	2Jul92	0 .0090	
MW-52	3Jul92	0 .0090	
MW-52	4Jul92	0 .0090	
MW-76	1Jul92	0 .0070	
MW-76	2Jul92	0 .0070	
MW-76	3Jul92	0 .0070	
MW-76	4Jul92	0 .0080	
MW-52	1Oct92	0 .0100	
MW-52	2Oct92	0 .0080	
MW-52	3Oct92	0 .0090	
MW-52	4Oct92	0 .0100	
MW-76	1Oct92	0 .0070	
MW-76	2Oct92	0 .0080	
MW-76	3Oct92	0 .0080	
MW-76	4Oct92	0 .0080	
MW-52	1Jan93	0 .0090	
MW-52	2Jan93	0 .0130	
MW-52	3Jan93	0 .0140	
MW-52	4Jan93	0 .0060	
MW-76	1Jan93	0 .0080	
MW-76	2Jan93	0 .0120	
MW-76	3Jan93	0 .0110	
MW-76	4Jan93	1 .0080	
MW-52	1Apr93	0 .0120	
MW-52	2Apr93	0 .0070	
MW-52	3Apr93	1 .0050	
MW-52	4Apr93	0 .0130	
MW-76	1Apr93	1 .0050	
MW-76	2Apr93	1 .0050	
MW-76	3Apr93	1 .0050	
MW-76	4Apr93	0 .0130	

Statistical Data for Background Samples

Number of samples = 32
Mean = .00869 (mg/L)
Variance = .00001 $(mg/L)^2$
Standard deviation = .00251 (mg/L)
Coefficient of variation = .28860

Significance level for analysis = .050
K value from table = 2.19800
Upper limit of tolerance interval (UTL) = .01420 (mg/L)

>>> TOLERANCE INTERVAL = (0, .014) <<<

```
**********************************************
*                                            *
*     STATISTICAL EVALUATION PACKAGE         *
*                                            *
*     *  One-Sided Tolerance Interval        *
*                                            *
*       Jones and Neuse, Inc. (1990)         *
*                                            *
**********************************************
```

Deep Well BG Data for Site H LTU -- Arsenic (mg/L) <as.bgd>

Columns/Rows 2 32
n1 32
n2 0

Background ID	Monitoring ID	Background Data [<]	Background Data	Monitoring Data [<]	Monitoring Data
MW-52A 1Jul92		0	.0080		
MW-52A 2Jul92		0	.0080		
MW-52A 3Jul92		0	.0070		
MW-52A 4Jul92		0	.0080		
MW-76A 1Jul92		0	.0080		
MW-76A 2Jul92		0	.0070		
MW-76A 3Jul92		0	.0070		
MW-76A 4Jul92		0	.0070		
MW-52A 1Oct92		0	.0110		
MW-52A 2Oct92		0	.0090		
MW-52A 3Oct92		0	.0090		
MW-52A 4Oct92		0	.0110		
MW-76A 1Oct92		0	.0080		
MW-76A 2Oct92		0	.0060		
MW-76A 3Oct92		0	.0070		
MW-76A 4Oct92		0	.0090		
MW-52A 1Jan93		0	.0080		
MW-52A 2Jan93		0	.0170		
MW-52A 3Jan93		0	.0120		
MW-52A 4Jan93		0	.0090		
MW-76A 1Jan93		0	.0100		
MW-76A 2Jan93		0	.0110		
MW-76A 3Jan93		0	.0070		
MW-76A 4Jan93		0	.0060		
MW-52A 1Apr93		0	.0120		
MW-52A 2Apr93		1	.0050		
MW-52A 3Apr93		1	.0050		
MW-52A 4Apr93		0	.0090		
MW-76A 1Apr93		1	.0050		
MW-76A 2Apr93		0	.0070		
MW-76A 3Apr93		1	.0050		
MW-76A 4Apr93		0	.0070		

Statistical Data for Background Samples

Number of samples = 32
Mean = .00828 (mg/L)
Variance = .00001 $(mg/L)^2$
Standard deviation = .00253 (mg/L)
Coefficient of variation = .30554

Significance level for analysis = .050
K value from table = 2.19800
Upper limit of tolerance interval (UTL) = .01384 (mg/L)

>>> TOLERANCE INTERVAL = (0, .014) <<<

```
*****************************************
*                                       *
*     STATISTICAL EVALUATION PACKAGE    *
*                                       *
*    *  One-Sided Tolerance Interval     *
*                                       *
*      Jones and Neuse, Inc. (1990)     *
*                                       *
*****************************************
```

Shallow Well BG Data for Site H LTU -- Chromium (mg/L) <cr.bgs>

Columns/Rows 2 31
n1 31
n2 0

Background ID	Monitoring ID	Background Data		Monitoring Data	
		[<]	[-------.----]	[<]	[-------.----]
MW-52	1Jul92	0	.0050		
MW-52	2Jul92	1	.0050		
MW-52	3Jul92	1	.0050		
MW-52	4Jul92	0	.0050		
MW-76	1Jul92	1	.0050		
MW-76	2Jul92	0	.0050		
MW-76	3Jul92	1	.0050		
MW-76	4Jul92	1	.0050		
MW-52	1Oct92	1	.0050		
MW-52	2Oct92	1	.0050		
MW-52	3Oct92	1	.0050		
MW-52	4Oct92	1	.0050		
MW-76	1Oct92	0	.0070		
MW-76	2Oct92	0	.0100		
MW-76	3Oct92	0	.0090		
MW-76	4Oct92	0	.0050		
MW-52	1Jan93	1	.0100		
MW-52	2Jan93	1	.0100		
MW-52	3Jan93	1	.0100		
MW-52	4Jan93	1	.0100		
MW-76	1Jan93	1	.0100		
MW-76	2Jan93	1	.0100		
MW-76	3Jan93	0	.0400		
MW-76	4Jan93	0	.0300		
MW-52	1Apr93	1	.0100		
MW-52	2Apr93	1	.0100		
MW-52	3Apr93	1	.0100		
MW-52	4Apr93	1	.0100		
MW-76	1Apr93	1	.0100		
MW-76	2Apr93	1	.0100		
MW-76	3Apr93	0	.0100		

Statistical Data for Background Samples

Number of samples = 31
Mean = .00939 (mg/L)
Variance = .00005 $(mg/L)^2$
Standard deviation = .00736 (mg/L)
Coefficient of variation = .78364

Significance level for analysis = .050
K value from table = 2.20900
Upper limit of tolerance interval (UTL) = .02564 (mg/L)

>>> TOLERANCE INTERVAL = (0, .026) <<<

```
*****************************************
*                                       *
*     STATISTICAL EVALUATION PACKAGE    *
*                                       *
*    *  One-Sided Tolerance Interval     *
*                                       *
*      Jones and Neuse, Inc. (1990)     *
*                                       *
*****************************************
```

Deep Well BG Data for Site H LTU -- Chromium (mg/L) <cr.bgd>

Columns/Rows 2 32
n1 32
n2 0

Background ID	Monitoring ID	Background Data	Monitoring Data
		[<][-------.----]	[<][-------.----]
MW-52A 1Jul92		0 .0060	
MW-52A 2Jul92		1 .0050	
MW-52A 3Jul92		1 .0050	
MW-52A 4Jul92		1 .0050	
MW-76A 1Jul92		1 .0050	
MW-76A 2Jul92		1 .0050	
MW-76A 3Jul92		1 .0050	
MW-76A 4Jul92		1 .0050	
MW-52A 1Oct92		0 .0080	
MW-52A 2Oct92		1 .0050	
MW-52A 3Oct92		1 .0050	
MW-52A 4Oct92		1 .0050	
MW-76A 1Oct92		1 .0050	
MW-76A 2Oct92		0 .0070	
MW-76A 3Oct92		1 .0050	
MW-76A 4Oct92		0 .0050	
MW-52A 1Jan93		1 .0100	
MW-52A 2Jan93		1 .0100	
MW-52A 3Jan93		1 .0100	
MW-52A 4Jan93		1 .0100	
MW-76A 1Jan93		1 .0100	
MW-76A 2Jan93		1 .0100	
MW-76A 3Jan93		1 .0100	
MW-76A 4Jan93		1 .0100	
MW-52A 1Apr93		1 .0100	
MW-52A 2Apr93		1 .0100	
MW-52A 3Apr93		1 .0100	
MW-52A 4Apr93		1 .0100	
MW-76A 1Apr93		1 .0100	
MW-76A 2Apr93		1 .0100	
MW-76A 3Apr93		1 .0100	
MW-76A 4Apr93		1 .0100	

Statistical Data for Background Samples

Number of samples = 32
Mean = .00769 (mg/L)
Variance = .00001 $(mg/L)^2$
Standard deviation = .00243 (mg/L)
Coefficient of variation = .31594

Significance level for analysis = .050
K value from table = 2.19800
Upper limit of tolerance interval (UTL) = .01303 (mg/L)

>>> TOLERANCE INTERVAL = (0, .013) <<<

```
*****************************************
*                                       *
*     STATISTICAL EVALUATION PACKAGE    *
*                                       *
*    *  One-Sided Tolerance Interval     *
*                                       *
*      Jones and Neuse, Inc. (1990)     *
*                                       *
*****************************************

Shallow Well BG Data for Site H LTU -- Phenols (mg/L)              <phe.bgs>
Columns/Rows          2   32
n1                   32
n2                    0

 Background ID    Monitoring ID    Background Data    Monitoring Data

[------------]  [------------]  [<][-------.----]  [<][-------.----]

 MW-52  1Jul92                    1         .0010
 MW-52  2Jul92                    1         .0010
 MW-52  3Jul92                    1         .0010
 MW-52  4Jul92                    1         .0010
 MW-76  1Jul92                    1         .0010
 MW-76  2Jul92                    0         .0080
 MW-76  3Jul92                    0         .0070
 MW-76  4Jul92                    0         .0080
 MW-52  1Oct92                    1         .0050
 MW-52  2Oct92                    1         .0050
 MW-52  3Oct92                    1         .0050
 MW-52  4Oct92                    1         .0050
 MW-76  1Oct92                    1         .0050
 MW-76  2Oct92                    1         .0050
 MW-76  3Oct92                    1         .0050
 MW-76  4Oct92                    1         .0050
 MW-52  1Jan93                    1         .0050
 MW-52  2Jan93                    1         .0050
 MW-52  3Jan93                    1         .0050
 MW-52  4Jan93                    1         .0050
 MW-76  1Jan93                    1         .0050
 MW-76  2Jan93                    1         .0050
 MW-76  3Jan93                    1         .0050
 MW-76  4Jan93                    1         .0050
 MW-52  1Apr93                    0         .0100
 MW-52  2Apr93                    0         .0200
 MW-52  3Apr93                    0         .0100
 MW-52  4Apr93                    0         .0100
 MW-76  1Apr93                    0         .0100
 MW-76  2Apr93                    0         .0100
 MW-76  3Apr93                    1         .0100
 MW-76  4Apr93                    1         .0100

-----------------------------------------
Statistical Data for Background Samples
-----------------------------------------

Number of samples          =            32
Mean                       =       .00619 (mg/L)
Variance                   =       .00001 (mg/L)^2
Standard deviation         =       .00384 (mg/L)
Coefficient of variation   =       .62044


Significance level for analysis        =          .050
K value from table                     =       2.19800
Upper limit of tolerance interval (UTL) =        .01463 (mg/L)

 >>> TOLERANCE INTERVAL = (0,      .015) <<<
```

```
*****************************************
*                                       *
*     STATISTICAL EVALUATION PACKAGE    *
*                                       *
*    *  One-Sided Tolerance Interval     *
*                                       *
*      Jones and Neuse, Inc. (1990)     *
*                                       *
*****************************************
```

Deep Well BG Data for Site H LTU -- Phenols (mg/L) <phe.bgd>

Columns/Rows 2 32
n1 32
n2 0

Background ID	Monitoring ID	Background Data	Monitoring Data
		[<][-------.----]	[<][-------.----]
MW-52A 1Jul92		0 .0150	
MW-52A 2Jul92		0 .0080	
MW-52A 3Jul92		0 .0070	
MW-52A 4Jul92		0 .0060	
MW-76A 1Jul92		0 .0130	
MW-76A 2Jul92		0 .0060	
MW-76A 3Jul92		0 .0030	
MW-76A 4Jul92		1 .0010	
MW-52A 1Oct92		1 .0050	
MW-52A 2Oct92		1 .0050	
MW-52A 3Oct92		1 .0050	
MW-52A 4Oct92		1 .0050	
MW-76A 1Oct92		1 .0050	
MW-76A 2Oct92		1 .0050	
MW-76A 3Oct92		1 .0050	
MW-76A 4Oct92		1 .0050	
MW-52A 1Jan93		1 .0050	
MW-52A 2Jan93		1 .0050	
MW-52A 3Jan93		1 .0050	
MW-52A 4Jan93		1 .0050	
MW-76A 1Jan93		0 .0060	
MW-76A 2Jan93		1 .0050	
MW-76A 3Jan93		1 .0050	
MW-76A 4Jan93		1 .0050	
MW-52A 1Apr93		0 .0200	
MW-52A 2Apr93		0 .0100	
MW-52A 3Apr93		0 .0200	
MW-52A 4Apr93		0 .0300	
MW-76A 1Apr93		1 .0100	
MW-76A 2Apr93		1 .0100	
MW-76A 3Apr93		1 .0100	
MW-76A 4Apr93		1 .0100	

Statistical Data for Background Samples

Number of samples = 32
Mean = .00813 (mg/L)
Variance = .00004 $(mg/L)^2$
Standard deviation = .00592 (mg/L)
Coefficient of variation = .72897

Significance level for analysis = .050
K value from table = 2.19800
Upper limit of tolerance interval (UTL) = .02114 (mg/L)

>>> TOLERANCE INTERVAL = (0, .021) <<<

```
**********************************************
*                                            *
*      STATISTICAL EVALUATION PACKAGE        *
*                                            *
*     *  Two-Sided Tolerance Interval        *
*                                            *
*       Jones and Neuse, Inc. (1992)         *
*                                            *
**********************************************
```

Shallow Well BG Data for Site H LTU -- pH (std) <pH.bgs>

Columns/Rows 2 26
n1 26
n2 0

Background ID		Monitoring ID	Background Data [<]	Monitoring Data [<]
MW-52	1Jul92		0 7.3100	
MW-76	1Jul92		0 7.0700	
MW-52	1Oct92		0 7.2800	
MW-52	2Oct92		0 7.3700	
MW-52	3Oct92		0 7.3800	
MW-52	4Oct92		0 7.4400	
MW-76	1Oct92		0 7.2800	
MW-76	2Oct92		0 7.4900	
MW-76	3Oct92		0 7.3800	
MW-76	4Oct92		0 7.4800	
MW-52	1Jan93		0 6.8100	
MW-52	2Jan93		0 7.2200	
MW-52	3Jan93		0 7.1000	
MW-52	4Jan93		0 7.1700	
MW-76	1Jan93		0 7.2500	
MW-76	2Jan93		0 7.3000	
MW-76	3Jan93		0 7.0900	
MW-76	4Jan93		0 7.1200	
MW-52	1Apr93		0 8.0400	
MW-52	2Apr93		0 7.2800	
MW-52	3Apr93		0 7.5500	
MW-52	4Apr93		0 7.3800	
MW-76	1Apr93		0 8.1400	
MW-76	2Apr93		0 7.2200	
MW-76	3Apr93		0 7.7800	
MW-76	4Apr93		0 7.4200	

Statistical Data for Background Samples

Number of samples = 26
Mean = 7.35961 (std units)
Variance = .08093 (std units)^2
Standard deviation = .28449 (std units)
Coefficient of variation = .03865

Significance level for analysis = .050
K value from table = 2.61000
Lower limit of tolerance interval (LTL) = 6.61711 (std units)
Upper limit of tolerance interval (UTL) = 8.10212 (std units)

>>> TOLERANCE INTERVAL = (6.617, 8.102) <<<

```
*****************************************
*                                       *
*     STATISTICAL EVALUATION PACKAGE    *
*                                       *
*    *  Two-Sided Tolerance Interval     *
*                                       *
*      Jones and Neuse, Inc. (1992)     *
*                                       *
*****************************************
```

Deep Well BG Data for Site H LTU -- pH (std) <pH.bgd>

Columns/Rows 2 26
n1 26
n2 0

Background ID	Monitoring ID	Background Data	Monitoring Data
		[<][-------.----]	[<][-------.----]
MW-52A 1Jul92		0 7.3100	
MW-76A 1Jul92		0 7.4400	
MW-52A 1Oct92		0 6.9600	
MW-52A 2Oct92		0 7.4200	
MW-52A 3Oct92		0 7.4000	
MW-52A 4Oct92		0 7.4100	
MW-76A 1Oct92		0 7.4900	
MW-76A 2Oct92		0 7.5800	
MW-76A 3Oct92		0 7.3200	
MW-76A 4Oct92		0 7.5500	
MW-52A 1Jan93		0 7.0700	
MW-52A 2Jan93		0 7.3600	
MW-52A 3Jan93		0 7.1200	
MW-52A 4Jan93		0 7.2200	
MW-76A 1Jan93		0 7.2700	
MW-76A 2Jan93		0 7.4000	
MW-76A 3Jan93		0 7.2000	
MW-76A 4Jan93		0 7.3200	
MW-52A 1Apr93		0 8.0000	
MW-52A 2Apr93		0 7.2800	
MW-52A 3Apr93		0 7.6400	
MW-52A 4Apr93		0 7.6700	
MW-76A 1Apr93		0 8.2200	
MW-76A 2Apr93		0 7.3600	
MW-76A 3Apr93		0 7.6400	
MW-76A 4Apr93		0 7.5100	

Statistical Data for Background Samples

Number of samples = 26
Mean = 7.42923 (std units)
Variance = .07137 $(\text{std units})^2$
Standard deviation = .26715 (std units)
Coefficient of variation = .03596

Significance level for analysis = .050
K value from table = 2.61000
Lower limit of tolerance interval (LTL) = 6.73198 (std units)
Upper limit of tolerance interval (UTL) = 8.12648 (std units)

>>> TOLERANCE INTERVAL = (6.732, 8.126) <<<

```
*****************************************
*                                       *
*     STATISTICAL EVALUATION PACKAGE    *
*                                       *
*          *  Factor Times DL           *
*                                       *
*      Jones and Neuse, Inc. (1990)     *
*                                       *
*****************************************
```

Shallow Well BG Data for Site H LTU -- Lead (mg/L) <pb.bgs>

Columns/Rows 2 32
n1 32
n2 0

Background ID	Monitoring ID	Background Data [<]	Background Data	Monitoring Data [<]	Monitoring Data
MW-52	1Jul92	1	.0050		
MW-52	2Jul92	1	.0050		
MW-52	3Jul92	1	.0050		
MW-52	4Jul92	1	.0050		
MW-76	1Jul92	1	.0050		
MW-76	2Jul92	1	.0050		
MW-76	3Jul92	1	.0050		
MW-76	4Jul92	1	.0050		
MW-52	1Oct92	1	.0050		
MW-52	2Oct92	1	.0050		
MW-52	3Oct92	1	.0050		
MW-52	4Oct92	1	.0050		
MW-76	1Oct92	1	.0050		
MW-76	2Oct92	1	.0050		
MW-76	3Oct92	1	.0050		
MW-76	4Oct92	1	.0050		
MW-52	1Jan93	1	.0050		
MW-52	2Jan93	1	.0050		
MW-52	3Jan93	1	.0050		
MW-52	4Jan93	1	.0050		
MW-76	1Jan93	1	.0050		
MW-76	2Jan93	1	.0050		
MW-76	3Jan93	1	.0050		
MW-76	4Jan93	1	.0050		
MW-52	1Apr93	1	.0040		
MW-52	2Apr93	1	.0040		
MW-52	3Apr93	1	.0040		
MW-52	4Apr93	1	.0040		
MW-76	1Apr93	1	.0040		
MW-76	2Apr93	1	.0040		
MW-76	3Apr93	1	.0040		
MW-76	4Apr93	1	.0040		

Statistical Data for Background Samples

Number of samples = 32
Average detection limit = .00475 (mg/L)
Detection limit factor = 2.00000
Upper control limit value (UCL) = .00950 (mg/L)

```
*****************************************
*                                       *
*     STATISTICAL EVALUATION PACKAGE    *
*                                       *
*          *  Factor Times DL           *
*                                       *
*      Jones and Neuse, Inc. (1990)     *
*                                       *
*****************************************
```

Deep Well BG Data for Site H LTU -- Lead (mg/L) <pb.bgd>

Columns/Rows 2 32
n1 32
n2 0

Background ID	Monitoring ID	Background Data		Monitoring Data	
		[<]	[-------.----]	[<]	[-------.----]
MW-52A 1Jul92		1	.0050		
MW-52A 2Jul92		1	.0050		
MW-52A 3Jul92		1	.0050		
MW-52A 4Jul92		1	.0050		
MW-76A 1Jul92		1	.0050		
MW-76A 2Jul92		1	.0050		
MW-76A 3Jul92		1	.0050		
MW-76A 4Jul92		1	.0050		
MW-52A 1Oct92		1	.0050		
MW-52A 2Oct92		1	.0050		
MW-52A 3Oct92		1	.0050		
MW-52A 4Oct92		1	.0050		
MW-76A 1Oct92		1	.0050		
MW-76A 2Oct92		1	.0050		
MW-76A 3Oct92		1	.0050		
MW-76A 4Oct92		1	.0050		
MW-52A 1Jan93		1	.0050		
MW-52A 2Jan93		1	.0050		
MW-52A 3Jan93		1	.0050		
MW-52A 4Jan93		1	.0050		
MW-76A 1Jan93		1	.0050		
MW-76A 2Jan93		1	.0050		
MW-76A 3Jan93		1	.0050		
MW-76A 4Jan93		1	.0050		
MW-52A 1Apr93		1	.0040		
MW-52A 2Apr93		1	.0040		
MW-52A 3Apr93		1	.0040		
MW-52A 4Apr93		1	.0040		
MW-76A 1Apr93		1	.0040		
MW-76A 2Apr93		1	.0040		
MW-76A 3Apr93		1	.0040		
MW-76A 4Apr93		1	.0040		

Statistical Data for Background Samples

Number of samples = 32
Average detection limit = .00475 (mg/L)
Detection limit factor = 2.00000
Upper control limit value (UCL) = .00950 (mg/L)

```
*****************************************
*                                       *
*     STATISTICAL EVALUATION PACKAGE    *
*                                       *
*          *  Factor Times DL           *
*                                       *
*      Jones and Neuse, Inc. (1990)     *
*                                       *
*****************************************
```

Shallow Well BG Data for Site H LTU -- Selenium (mg/L) <se.bgs>

Columns/Rows 2 32
n1 32
n2 0

Background ID	Monitoring ID	Background Data [<]	Background Data	Monitoring Data [<]	Monitoring Data
MW-52	1Jul92	1	.0500		
MW-52	2Jul92	1	.0500		
MW-52	3Jul92	1	.0500		
MW-52	4Jul92	1	.0500		
MW-76	1Jul92	1	.0500		
MW-76	2Jul92	1	.0500		
MW-76	3Jul92	1	.0500		
MW-76	4Jul92	1	.0500		
MW-52	1Oct92	1	.0500		
MW-52	2Oct92	1	.0500		
MW-52	3Oct92	1	.0500		
MW-52	4Oct92	1	.0500		
MW-76	1Oct92	1	.0500		
MW-76	2Oct92	1	.0500		
MW-76	3Oct92	1	.0500		
MW-76	4Oct92	1	.0500		
MW-52	1Jan93	1	.0500		
MW-52	2Jan93	1	.0500		
MW-52	3Jan93	1	.0500		
MW-52	4Jan93	1	.0500		
MW-76	1Jan93	1	.0500		
MW-76	2Jan93	1	.0500		
MW-76	3Jan93	1	.0500		
MW-76	4Jan93	1	.0500		
MW-52	1Apr93	1	.0500		
MW-52	2Apr93	1	.0500		
MW-52	3Apr93	1	.0500		
MW-52	4Apr93	1	.0500		
MW-76	1Apr93	1	.0500		
MW-76	2Apr93	1	.0500		
MW-76	3Apr93	1	.0500		
MW-76	4Apr93	1	.0500		

Statistical Data for Background Samples

Number of samples = 32
Average detection limit = .05000 (mg/L)
Detection limit factor = 2.00000
Upper control limit value (UCL) = .10000 (mg/L)

```
*****************************************
*                                       *
*     STATISTICAL EVALUATION PACKAGE    *
*                                       *
*          *  Factor Times DL           *
*                                       *
*      Jones and Neuse, Inc. (1990)     *
*                                       *
*****************************************
```

Deep Well BG Data for Site H LTU -- Selenium (mg/L) <se.bgd>

Columns/Rows 2 32
n1 32
n2 0

Background ID	Monitoring ID	Background Data		Monitoring Data	
		[<]	[-------.----]	[<]	[--------.----]
MW-52A 1Jul92		1	.0500		
MW-52A 2Jul92		1	.0500		
MW-52A 3Jul92		1	.0500		
MW-52A 4Jul92		1	.0500		
MW-76A 1Jul92		1	.0500		
MW-76A 2Jul92		1	.0500		
MW-76A 3Jul92		1	.0500		
MW-76A 4Jul92		1	.0500		
MW-52A 1Oct92		1	.0500		
MW-52A 2Oct92		1	.0500		
MW-52A 3Oct92		1	.0500		
MW-52A 4Oct92		1	.0500		
MW-76A 1Oct92		1	.0500		
MW-76A 2Oct92		1	.0500		
MW-76A 3Oct92		1	.0500		
MW-76A 4Oct92		1	.0500		
MW-52A 1Jan93		1	.0500		
MW-52A 2Jan93		1	.0500		
MW-52A 3Jan93		1	.0500		
MW-52A 4Jan93		1	.0500		
MW-76A 1Jan93		1	.0500		
MW-76A 2Jan93		1	.0500		
MW-76A 3Jan93		1	.0500		
MW-76A 4Jan93		1	.0500		
MW-52A 1Apr93		1	.0500		
MW-52A 2Apr93		1	.0500		
MW-52A 3Apr93		1	.0500		
MW-52A 4Apr93		1	.0500		
MW-76A 1Apr93		1	.0500		
MW-76A 2Apr93		1	.0500		
MW-76A 3Apr93		1	.0500		
MW-76A 4Apr93		1	.0500		

Statistical Data for Background Samples

Number of samples = 32
Average detection limit = .05000 (mg/L)
Detection limit factor = 2.00000
Upper control limit value (UCL) = .10000 (mg/L)

```
*****************************************
*                                       *
*     STATISTICAL EVALUATION PACKAGE    *
*                                       *
*          *  Factor Times DL           *
*                                       *
*      Jones and Neuse, Inc. (1990)     *
*                                       *
*****************************************
```

Deep Well BG Data for Site H LTU -- Benzene (ug/L) <ben.bgd>

Columns/Rows 2 32
n1 32
n2 0

Background ID	Monitoring ID	Background Data [<]	Background Data	Monitoring Data [<]	Monitoring Data
MW-52A 1Jul92		1	1.0000		
MW-52A 2Jul92		1	1.0000		
MW-52A 3Jul92		1	1.0000		
MW-52A 4Jul92		1	1.0000		
MW-76A 1Jul92		1	1.0000		
MW-76A 2Jul92		1	1.0000		
MW-76A 3Jul92		1	1.0000		
MW-76A 4Jul92		1	1.0000		
MW-52A 1Oct92		1	1.0000		
MW-52A 2Oct92		1	1.0000		
MW-52A 3Oct92		1	1.0000		
MW-52A 4Oct92		1	1.0000		
MW-76A 1Oct92		1	1.0000		
MW-76A 2Oct92		1	1.0000		
MW-76A 3Oct92		1	1.0000		
MW-76A 4Oct92		1	1.0000		
MW-52A 1Jan93		1	1.0000		
MW-52A 2Jan93		1	1.0000		
MW-52A 3Jan93		1	1.0000		
MW-52A 4Jan93		1	1.0000		
MW-76A 1Jan93		1	1.0000		
MW-76A 2Jan93		1	1.0000		
MW-76A 3Jan93		1	1.0000		
MW-76A 4Jan93		1	1.0000		
MW-52A 1Apr93		1	1.0000		
MW-52A 2Apr93		1	1.0000		
MW-52A 3Apr93		1	1.0000		
MW-52A 4Apr93		1	1.0000		
MW-76A 1Apr93		1	1.0000		
MW-76A 2Apr93		1	1.0000		
MW-76A 3Apr93		1	1.0000		
MW-76A 4Apr93		1	1.0000		

Statistical Data for Background Samples

Number of samples = 32
Average detection limit = 1.00000 (ug/L)
Detection limit factor = 2.00000
Upper control limit value (UCL) = 2.00000 (ug/L)

```
*****************************************
*                                       *
*     STATISTICAL EVALUATION PACKAGE    *
*                                       *
*          *  Factor Times DL           *
*                                       *
*      Jones and Neuse, Inc. (1990)     *
*                                       *
*****************************************
```

Shallow Well BG Data for Site H LTU -- Benzene (ug/L) <ben.bgs>

Columns/Rows 2 32
n1 32
n2 0

Background ID	Monitoring ID	Background Data [<]	Background Data [-------.----]	Monitoring Data [<]	Monitoring Data [-------.----]
MW-52	1Jul92	1	1.0000		
MW-52	2Jul92	1	1.0000		
MW-52	3Jul92	1	1.0000		
MW-52	4Jul92	1	1.0000		
MW-76	1Jul92	1	1.0000		
MW-76	2Jul92	1	1.0000		
MW-76	3Jul92	1	1.0000		
MW-76	4Jul92	1	1.0000		
MW-52	1Oct92	1	1.0000		
MW-52	2Oct92	1	1.0000		
MW-52	3Oct92	1	1.0000		
MW-52	4Oct92	1	1.0000		
MW-76	1Oct92	1	1.0000		
MW-76	2Oct92	1	1.0000		
MW-76	3Oct92	1	1.0000		
MW-76	4Oct92	1	1.0000		
MW-52	1Jan93	1	1.0000		
MW-52	2Jan93	1	1.0000		
MW-52	3Jan93	1	1.0000		
MW-52	4Jan93	1	1.0000		
MW-76	1Jan93	1	1.0000		
MW-76	2Jan93	1	1.0000		
MW-76	3Jan93	1	1.0000		
MW-76	4Jan93	1	1.0000		
MW-52	1Apr93	1	1.0000		
MW-52	2Apr93	1	1.0000		
MW-52	3Apr93	1	1.0000		
MW-52	4Apr93	1	1.0000		
MW-76	1Apr93	1	1.0000		
MW-76	2Apr93	1	1.0000		
MW-76	3Apr93	1	1.0000		
MW-76	4Apr93	1	1.0000		

Statistical Data for Background Samples

Number of samples = 32
Average detection limit = 1.00000 (ug/L)
Detection limit factor = 2.00000
Upper control limit value (UCL) = 2.00000 (ug/L)

```
*****************************************
*                                       *
*     STATISTICAL EVALUATION PACKAGE    *
*                                       *
*          *  Factor Times DL           *
*                                       *
*      Jones and Neuse, Inc. (1990)     *
*                                       *
*****************************************
```

Deep Well BG Data for Site H LTU -- Toluene (ug/L) <tol.bgd>

Columns/Rows 2 32
n1 32
n2 0

Background ID	Monitoring ID	Background Data [<]	Background Data	Monitoring Data [<]	Monitoring Data
MW-52A 1Jul92		1	1.0000		
MW-52A 2Jul92		1	1.0000		
MW-52A 3Jul92		1	1.0000		
MW-52A 4Jul92		1	1.0000		
MW-76A 1Jul92		1	1.0000		
MW-76A 2Jul92		1	1.0000		
MW-76A 3Jul92		1	1.0000		
MW-76A 4Jul92		1	1.0000		
MW-52A 1Oct92		1	1.0000		
MW-52A 2Oct92		1	1.0000		
MW-52A 3Oct92		1	1.0000		
MW-52A 4Oct92		1	1.0000		
MW-76A 1Oct92		1	1.0000		
MW-76A 2Oct92		1	1.0000		
MW-76A 3Oct92		1	1.0000		
MW-76A 4Oct92		1	1.0000		
MW-52A 1Jan93		1	1.0000		
MW-52A 2Jan93		1	1.0000		
MW-52A 3Jan93		1	1.0000		
MW-52A 4Jan93		1	1.0000		
MW-76A 1Jan93		1	1.0000		
MW-76A 2Jan93		1	1.0000		
MW-76A 3Jan93		1	1.0000		
MW-76A 4Jan93		1	1.0000		
MW-52A 1Apr93		1	1.0000		
MW-52A 2Apr93		1	1.0000		
MW-52A 3Apr93		1	1.0000		
MW-52A 4Apr93		1	1.0000		
MW-76A 1Apr93		1	1.0000		
MW-76A 2Apr93		1	1.0000		
MW-76A 3Apr93		1	1.0000		
MW-76A 4Apr93		1	1.0000		

Statistical Data for Background Samples

Number of samples	=	32
Average detection limit	=	1.00000 (ug/L)
Detection limit factor	=	2.00000
Upper control limit value (UCL)	=	2.00000 (ug/L)

```
*****************************************
*                                       *
*     STATISTICAL EVALUATION PACKAGE    *
*                                       *
*          *  Factor Times DL           *
*                                       *
*     Jones and Neuse, Inc. (1990)      *
*                                       *
*****************************************
```

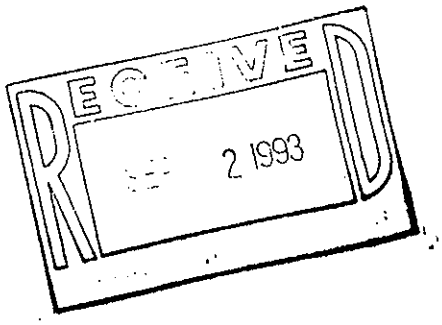
Shallow Well BG Data for Site H LTU -- Toluene (ug/L) <tol.bgs>

Columns/Rows 2 32
n1 32
n2 0

Background ID	Monitoring ID	Background Data [<]	Background Data	Monitoring Data [<]	Monitoring Data
MW-52	1Jul92	1	1.0000		
MW-52	2Jul92	1	1.0000		
MW-52	3Jul92	1	1.0000		
MW-52	4Jul92	1	1.0000		
MW-76	1Jul92	1	1.0000		
MW-76	2Jul92	1	1.0000		
MW-76	3Jul92	1	1.0000		
MW-76	4Jul92	1	1.0000		
MW-52	1Oct92	1	1.0000		
MW-52	2Oct92	1	1.0000		
MW-52	3Oct92	1	1.0000		
MW-52	4Oct92	1	1.0000		
MW-76	1Oct92	1	1.0000		
MW-76	2Oct92	1	1.0000		
MW-76	3Oct92	1	1.0000		
MW-76	4Oct92	1	1.0000		
MW-52	1Jan93	1	1.0000		
MW-52	2Jan93	1	1.0000		
MW-52	3Jan93	1	1.0000		
MW-52	4Jan93	1	1.0000		
MW-76	1Jan93	1	1.0000		
MW-76	2Jan93	1	1.0000		
MW-76	3Jan93	1	1.0000		
MW-76	4Jan93	1	1.0000		
MW-52	1Apr93	1	1.0000		
MW-52	2Apr93	1	1.0000		
MW-52	3Apr93	1	1.0000		
MW-52	4Apr93	1	1.0000		
MW-76	1Apr93	1	1.0000		
MW-76	2Apr93	1	1.0000		
MW-76	3Apr93	1	1.0000		
MW-76	4Apr93	1	1.0000		

Statistical Data for Background Samples

Number of samples = 32
Average detection limit = 1.00000 (ug/L)
Detection limit factor = 2.00000
Upper control limit value (UCL) = 2.00000 (ug/L)


RECEIVED
2 1993

ATTACHMENT VI.B.3.D SITE H MONITOR WELL LOGS

MONITOR WELL INSTALLATION

WELL NO.: MW-52

CLIENT: Fina Oil and Chemical Company JOB NO.: 119505 DATE DRILLED: _____ SHEET 1 of 2

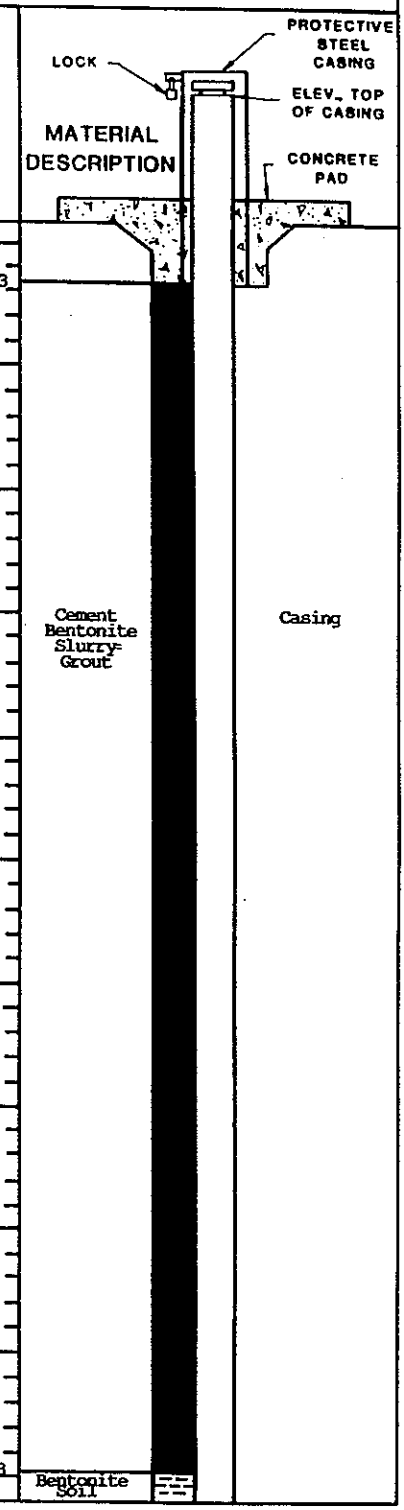
SITE: Site B/Big Spring, Texas ELEVATION: PAD 2515.35 TOP OF PVC CASING 2517.60

TOTAL DEPTH: 2390.10 CASING SIZE & TYPE: 2-inch ID PVC SCREEN SIZE: 0.010 mill slot

WATER LEVEL: 111.68 REF.: TOC DATE: 4/4/89 TIME: 1133 hrs GEOLOGIST: Robert L. Sherrill

DEPTH	N. VALUE (BLOW/FT)	POCKET PENETROMETER (TONS/FT²)	SYMBOL	STRATIGRAPHY	SAMPLE DESCRIPTION
0			SP		Sand - uniform fine, loose, orange, drill, FILL
10			SP		Sand - similar to above, FILL
20			SP		Sand - uniform fine, loose, red, dry
30			SP		Sand - similar to above with minor silt in pockets
40			SP		Sand - similar to above without silt
50			SP		Sand - similar to above with minor isolated calcareous gravel
60			SP		Gravelly Sand - similar to above except 10% fine subrounded calcareous gravel
70			SP		Gravelly Sand - similar to above except 15% medium subrounded calcareous gravel
80			SP		Gravelly Sand - similar to above
90			SP		Sand - uniform fine sand, loose, red, dry, no odor
100			SP		Sand - similar to above

COMPLETION DATA



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MONITOR WELL INSTALLATION

WELL NO.: MW-52

CLIENT: Fina Oil and Chemical Company JOB NO.: 119505 DATE DRILLED: _____ SHEET 2 of 2

SITE: Site B/Big Spring, Texas ELEVATION: PAD _____ TOP OF PVC CASING _____

TOTAL DEPTH: _____ CASING SIZE & TYPE: 2 in ID PVC SCREEN SIZE: 0.010 mill slot

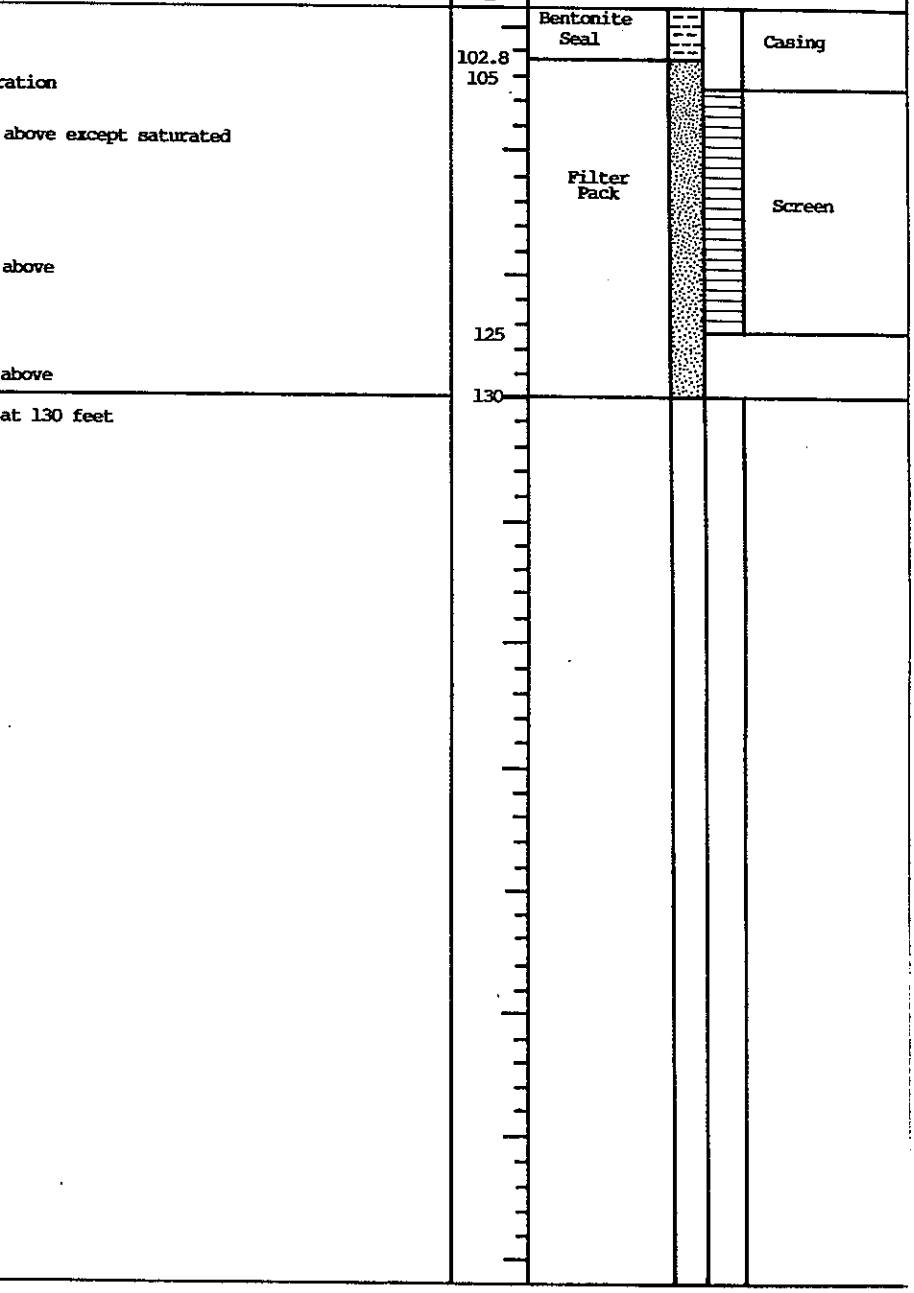
WATER LEVEL : _____ REF.: TOC DATE: 4/4/89 TIME: _____ GEOLOGIST: Robert L. Sherrill

DEPTH	N. VALUE (BLOW/FT.)	POCKET PENETROMETER (TONS/FT^2)	SYMBOL	STRATIGRAPHY	SAMPLE DESCRIPTION
100					
					▼ Top of saturation
110			SP		Sand - similar to above except saturated
120			SP		Sand - similar to above
130			SP		Sand - similar to above
					Boring terminated at 130 feet

COMPLETION DATA

MATERIAL SETTING

MATERIAL DESCRIPTION CONT.



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MONITOR WELL INSTALLATION

WELL NO.: ~~MW-52A~~

CLIENT: Fina Oil and Chemical Company JOB NO.: 119505 DATE DRILLED: 3/31/89 SHEET 1 of 2

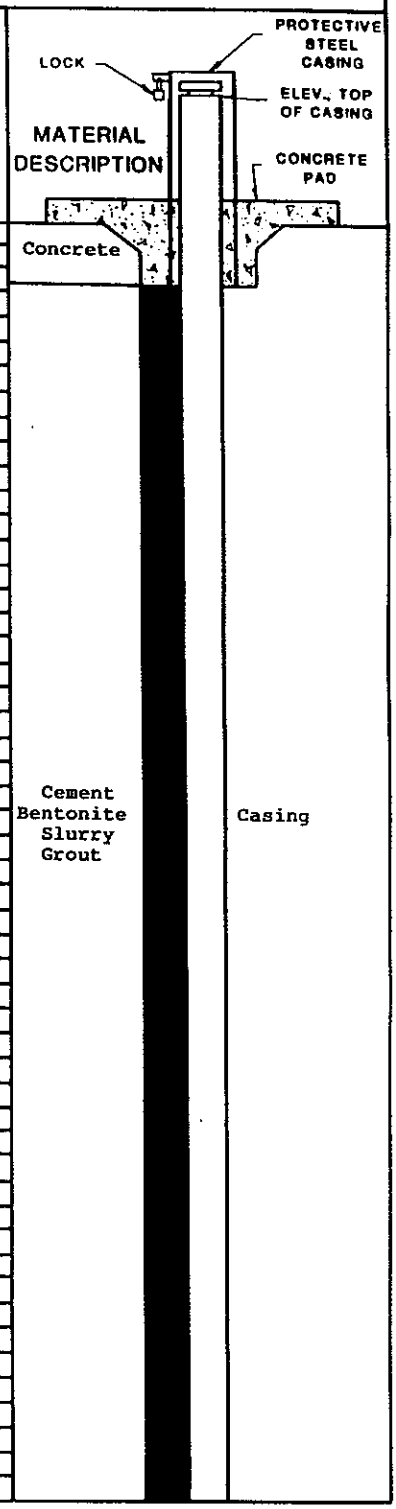
SITE: Site H/Big Spring, Texas ELEVATION: PAD 2515.33 TOP OF PVC CASING 2517.53

TOTAL DEPTH: 2358.08 CASING SIZE & TYPE: 2 in ID PVC SCREEN SIZE: 0.010 mill slot

WATER LEVEL: 111.50 REF.: TOC DATE: 4/4/89 TIME: 1130 hrs GEOLOGIST: Robert L. Shercill

DEPTH	N. VALUE (BLOW/FT)	POCKET PENETROMETER (TONS/FT²)	SYMBOL	STRATIGRAPHY	SAMPLE DESCRIPTION
0			SP		Sand - uniform fine, loose, orange, dry, FILL
10			SP		Sand - similar to above, FILL
20			SP		Sand - uniform fine, loose, red, dry
30			SP		Sand - similar to above with minor silt in pockets
40			SP		Sand - similar to above without silt
50			SP		Sand - similar to above with minor
60			SP		Gravelly Sand - similar to above except 10% fine subrounded calcareous gravel
70			SP		Gravelly Snad - similar to above except 15% medium subrounded calcareous gravel
80			SP		Gravelly Sand - similar to above
90			SP		Sand - uniform fine sand, loose, red, dry, no odor
100			SP		Sand - similar to above

COMPLETION DATA



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MONITOR WELL INSTALLATION

WELL NO.: MW-52A

CLIENT: Fina Oil and Chemical Company JOB NO.: 119505 DATE DRILLED: _____ SHEET 2 of 2

SITE: Site H/ Big Spring, Texas ELEVATION: PAD 2515.33 TOP OF PVC CASING 2517.53

TOTAL DEPTH: 2358.08 CASING SIZE & TYPE: 2 in ID PVC SCREEN SIZE: 0.010 mill slot

WATER LEVEL : 111.50 REF.: TOC DATE: 4/4/89 TIME: 1130 hrs GEOLOGIST: Robert L. Shergill

DEPTH	N. VALUE (BLOW/FT.)	POCKET PENETROMETER (TONS/FT^2)	SYMBOL	STRATIGRAPHY	SAMPLE DESCRIPTION
100					▼ Top of Saturation
110			SP		Sand - similar to above except saturated
120			SP		Sand - similar to above
130			SP		Sand - similar to above
140			GP		Sandy Gravel - poorly graded, 90% rounded chert and calcareous gravel, medium, 10% fine sand, loose, red, saturated
			CH		Clay - highly plastic, hard, damp, red
150			GP		Sandy Gravel - poorly graded, 90% rounded chert and calcareous gravel, medium, 10% medium sand, loose, red, saturated
160			CH		Clay - highly plastic, hard, damp, red
					Boring terminated 160 feet below grade

COMPLETION DATA

MATERIAL SETTING	MATERIAL DESCRIPTION CONT.
	Cement/Bentonite Slurry Grout
131.9	
	Bentonite Seal
134.8	
137	
	Filter Pack
157	
157.3	Collapse
160	

Casing

Screen

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MONITOR WELL INSTALLATION

WELL NO.: MW-53

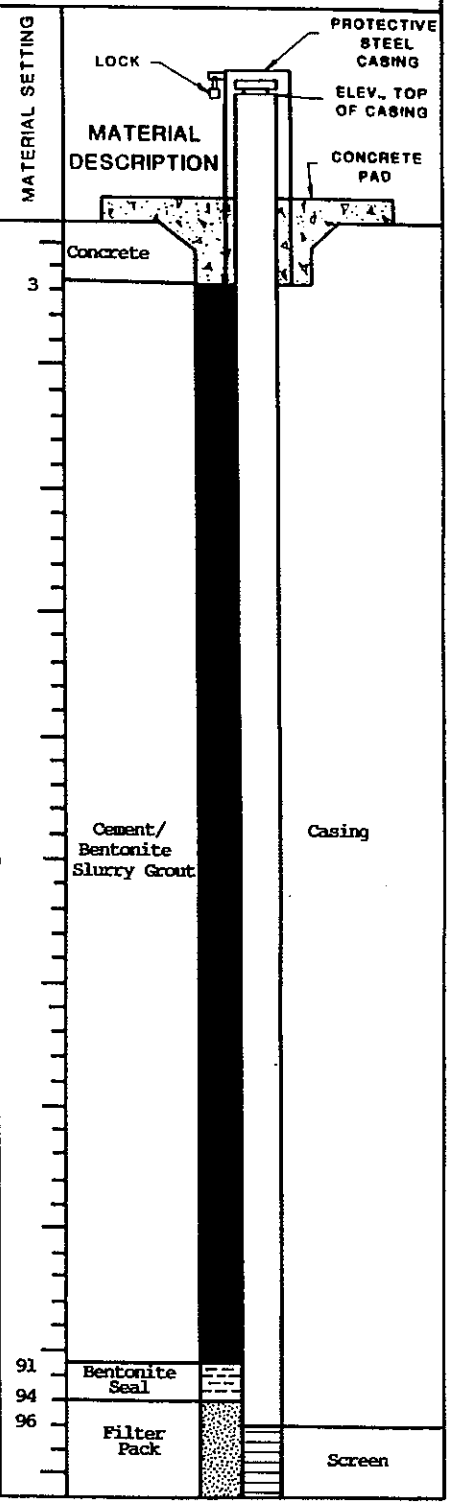
CLIENT: Pina Oil and Chemical Company JOB NO.: 119505 DATE DRILLED: 3/30/89 SHEET 1 of 2

SITE: Site H/Big Spring, Texas ELEVATION: PAD 2508.36 TOP OF PVC CASING 2510.06

TOTAL DEPTH: 2392.11 CASING SIZE & TYPE: 2 in ID PVC SCREEN SIZE: 0.010 mill slot

WATER LEVEL: 104.32 REF.: TOC DATE: 4/4/89 TIME: 1118 hrs GEOLOGIST: Robert L. Sherrill

DEPTH	N. VALUE (BLOW/FT)	POCKET PENETROMETER (TONS/FT²)	SYMBOL	STRATIGRAPHY	SAMPLE DESCRIPTION
0			CL		Sandy Clay - highly plastic, 15% fine sand, very stiff, dry, red, no odor (FILL)
10			SM		Silty Sand - uniform fine sand, compact, 8% silt in matrix, dry, red, no odor
20			SP		Sand - similar to above except < 5% silt in pockets
30			SP		Sand - uniform very fine, loose, dry, orange, no odor
40			SP		Sand - similar to above
50			SP		Gravelly Sand - similar to above except 10% fine rounded calcareous gravel
60			SP		Gravelly Sand - similar to above
70			SP		Gravelly Sand - similar to above
80			SP		Gravelly Sand - similar to above
90			SP		Sand - similar to above except < 5% gravel, damp
					Top of Saturation
100			SP		Sand - similar to above except saturated



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MONITOR WELL INSTALLATION

WELL NO.: MW-53

CLIENT: Pine Oil and Chemical Company JOB NO.: 119505 DATE DRILLED: 3/30/89 SHEET 2 of 2

SITE: Site B/Big Spring, Texas ELEVATION: PAD 2508.36 TOP OF PVC CASING 2510.06

TOTAL DEPTH: 2392.11 CASING SIZE & TYPE: 2 in ID PVC SCREEN SIZE: 0.010 mill slot

WATER LEVEL : 104.32 REF.: TOC DATE: 4/4/89 TIME: 1118 hrs GEOLOGIST: Robert L. Sherrill

DEPTH	N. VALUE (BLOW/FT.)	POCKET PENETROMETER (TONS/FT^2)	SYMBOL	STRATIGRAPHY	SAMPLE DESCRIPTION
100					
110			SP		Sand - similar to above
120			GP		Sandy Gravel - poorly graded, fine to medium subrounded chert gravel, 10% fine sand, loose, red, saturated
130			GP		Sandy Gravel- similar to above
					Boring terminated at 130 feet

COMPLETION DATA

MATERIAL SETTING	MATERIAL DESCRIPTION CONT.
116	Filter Pack
118	Collapse
130	Screen

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MONITOR WELL INSTALLATION

WELL NO.: MW-53A

CLIENT: Fina Oil and Chemical Company JOB NO.: 119505 DATE DRILLED: 3/30/89 SHEET 1 of 2

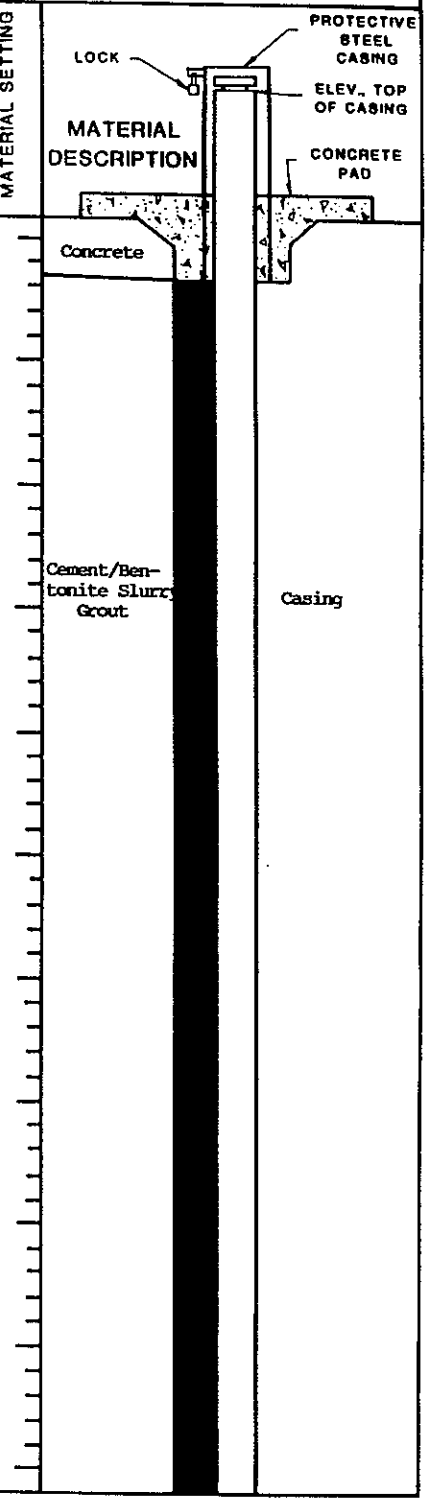
SITE: Site H/Big Spring, Texas ELEVATION: PAD 2508.24 TOP OF PVC CASING 2509.89

TOTAL DEPTH: 2370.99 CASING SIZE & TYPE: 2 in ID PVC SCREEN SIZE: 0.010 mill slot

WATER LEVEL: 104.08 REF.: TOC DATE: 4/4/89 TIME: 1115 hrs GEOLOGIST: Robert L. Sherrill

DEPTH	N. VALUE (BLOW/FT)	POCKET PENETROMETER (TONS/FT²)	SYMBOL	STRATIGRAPHY	SAMPLE DESCRIPTION
0			CL		Sandy Clay – highly plastic, 15% fine sand, very stiff, dry, red, no odor (FILL)
10			SM		Silty Sand – uniform fine sand, compact, 8% silt in matrix, dry, red, no odor
20			SP		Sand – similar to above except <5% silt in pockets
30			SP		Sand – uniform very fine, loose, dry, orange, no odor
40			SP		Sand – similar to above
50			SP		Gravelly Sand – similar to above except 10% fine rounded calcareous gravel
60			SP		Gravelly Sand – similar to above
70			SP		Gravelly Sand – similar to above
80			SP		Gravelly Sand – similar to above
90			SP		Sand – similar to above except <5% gravel, damp
					▼ Top of Saturation
100			SP		Sand – similar to above except saturated

COMPLETION DATA



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MONITOR WELL INSTALLATION

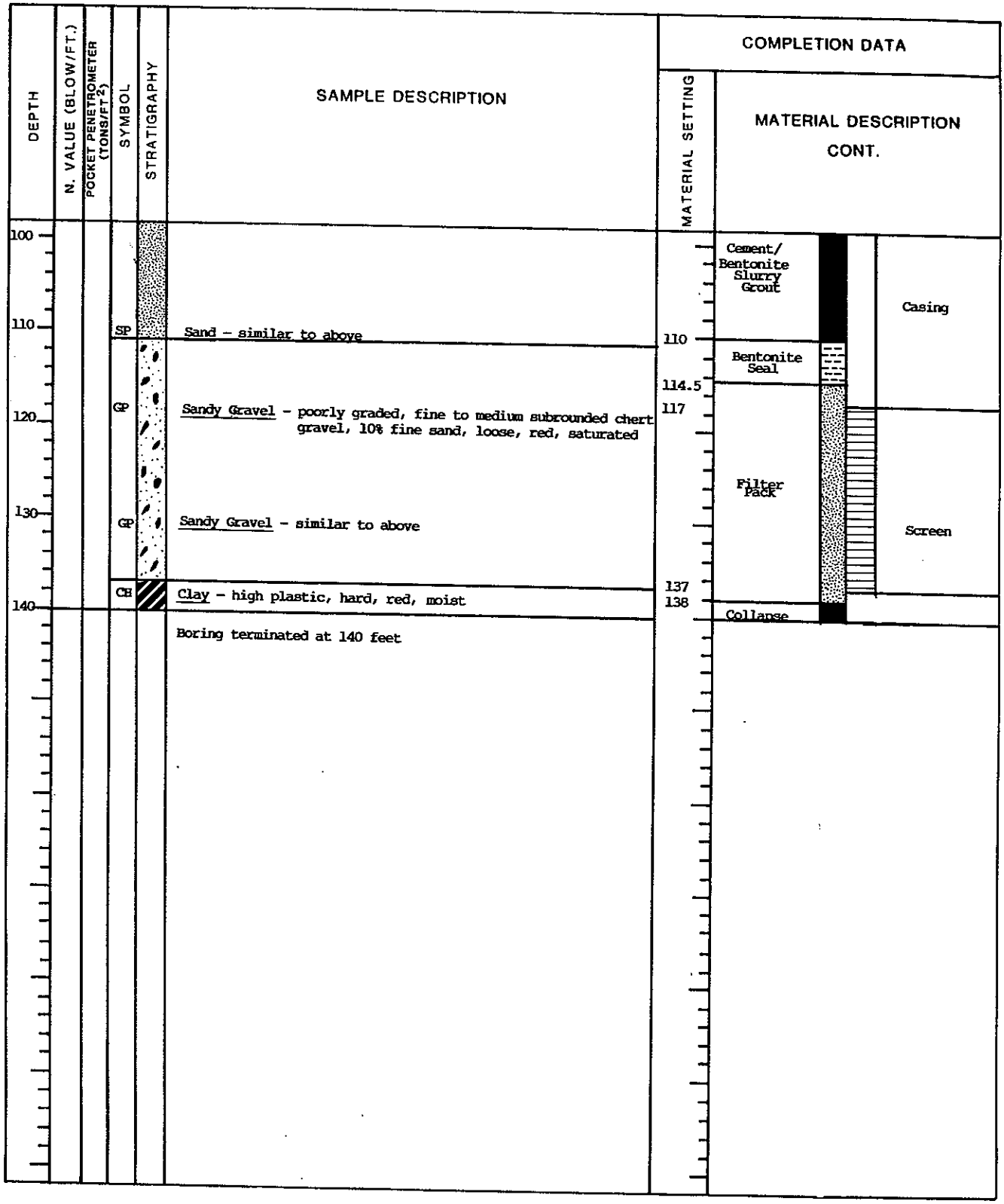
WELL NO.: MW-53A

CLIENT: Fina Oil and Chemical Company JOB NO.: 119505 DATE DRILLED: 4/4/89 SHEET 2 of 2

SITE: Site B/Big Spring, Texas ELEVATION: PAD 2508.24 TOP OF PVC CASING 2509.89

TOTAL DEPTH: 2370.99 CASING SIZE & TYPE: 2 in ID PVC SCREEN SIZE: 0.010 mill slot

WATER LEVEL : 104.08 REF.: TOC DATE: 4/4/89 TIME: 1115 hrs GEOLOGIST: Robert L. Sherrill



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MONITOR WELL INSTALLATION

WELL NO.: MW- 54

CLIENT: Fina Oil and Chemical Company JOB NO.: 119505 DATE DRILLED: 3/27/89 SHEET 1 of 2

SITE: Site B/Big Spring, Texas ELEVATION: PAD 2505.41 TOP OF PVC CASING 2506.71

TOTAL DEPTH: 2386.66 CASING SIZE & TYPE: 2-inch PVC SCREEN SIZE: 0.010 mill slot

WATER LEVEL: 100.51 REF.: TOC DATE: 4/4/89 TIME: 1105 hrs GEOLOGIST: Robert L. Sherrill

DEPTH	N. VALUE (BLOW/FT)	POCKET PENETROMETER (TONS/FT2)	SYMBOL	STRATIGRAPHY	SAMPLE DESCRIPTION
0			CL		Sandy Clay – Moderately plastic, 30% very fine sand, hard, red damp, FILL.
10			SM		Silty Sand – Uniform fine sand, 10% silt in matrix, compact dry, red
20			SP		Sand – Uniform very fine, loose, dry, red, no odor
30			SP		Sand – Similar to above
40			SP		Sand – Similar to above
50			SP		Sand – Similar to above except has 5% medium calcareous nodules
60			SS		Sandstone – Medium dense, moderately weathered, calcareous cement, light orange, dry, no odor.
70			SP		Gravelly Sand – Uniform fine sand, loose, 20% medium calcareous gravel, subrounded, orange, dry no odor
80			SP		Sand – Uniform very fine sand, loose, dry, orange, no odor
90			SP		Sand – Similar to above except damp
100			SP		Top of Saturation Gravelly Sand – Similar to above except 20% fine calcareous gravel, saturated

COMPLETION DATA

MATERIAL SETTING	MATERIAL DESCRIPTION
3	Concrete
	Cement/ Bentonite Slurry Grout
90	Bentonite Seal
95.2	Filter Pack
98.5	

LOCK
PROTECTIVE STEEL CASING
ELEV., TOP OF CASING
CONCRETE PAD
Casing
Screen

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MONITOR WELL INSTALLATION

WELL NO.: MW-54

CLIENT: Pina Oil and Chemical Company JOB NO.: 119505 DATE DRILLED: 3/28/89 SHEET 2 of 2

SITE: Site B/Big Spring, Texas ELEVATION: PAD 2505.56 TOP OF PVC CASING 2507.04

TOTAL DEPTH: 2367.31 CASING SIZE & TYPE: 2-inch ID PVC SCREEN SIZE: 0.010 Mill Slot

WATER LEVEL : 100.50 REF.: TOC DATE: 4/4/89 TIME: 1110 hrs GEOLOGIST: Robert L. Sherrill

DEPTH	N. VALUE (BLOW/FT.)	POCKET PENETROMETER (TONS/FT^2)	SYMBOL	STRATIGRAPHY	SAMPLE DESCRIPTION
100					
110			GP		Sandy Gravel - uniform fines ubrounded calcareous gravel, loose, 40% fine sand, orange, saturated, no odor
120			SP		Gravelly Sand - similar to above except with 40% gravel
130			GP		Gravel - uniform medium subrounded chert gravel, loose, 5% medium sand, tan,s aturated, no odor
140			CH		Clay - highly plastic, hard, red, moist, no odor
150			CH		Clay - similar to above
					Boring terminated at 150 feet

COMPLETION DATA

MATERIAL SETTING	MATERIAL DESCRIPTION CONT.
118.5	Filter Pack / Screen
122	Collapse
150	

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MONITOR WELL INSTALLATION

WELL NO.: ~~MW~~ 54A

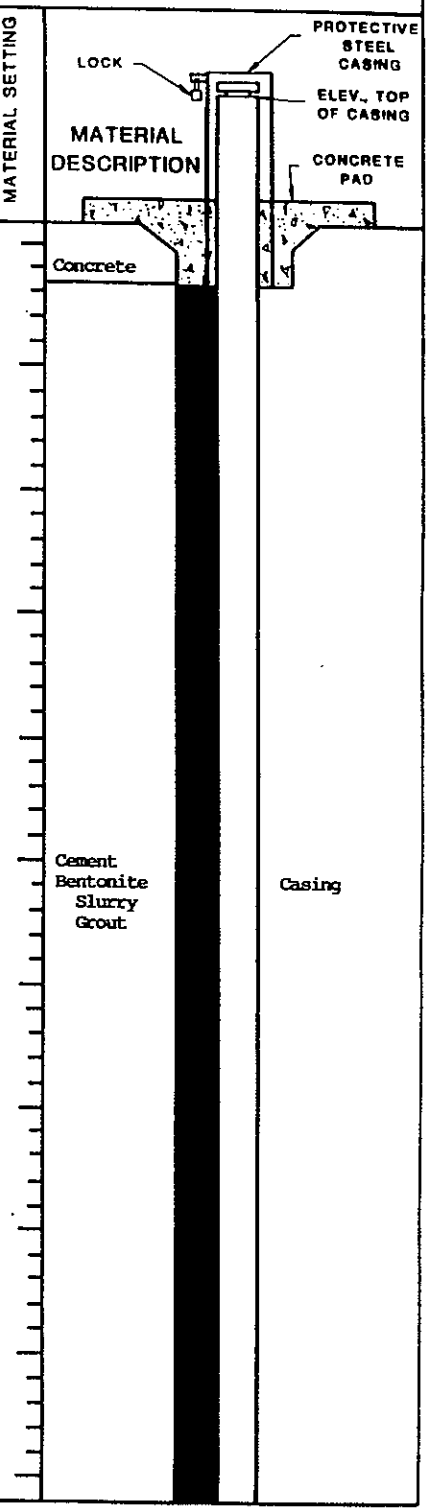
CLIENT: Fina Oil and Chemical Company JOB NO.: 119505 DATE DRILLED: 3/28/89 SHEET 1 of 2

SITE: Site H/Big Spring, TX ELEVATION: PAD 2505.56 TOP OF PVC CASING 2507.04

TOTAL DEPTH: 2367.31 CASING SIZE & TYPE: 2 in ID PVC SCREEN SIZE: 0.010 mill slot

WATER LEVEL: 100.50 REF.: TOC DATE: 4/4/89 TIME: 1110 hrs GEOLOGIST: Robert L. Sherrill

DEPTH	N. VALUE (BLOW/FT)	POCKET PENETROMETER (TONS/FT2)	SYMBOL	STRATIGRAPHY	SAMPLE DESCRIPTION
0			CL		Sandy Clay - moderately plastic, 30% very fine sand, hard, red, damp; FILL
10			SM		Silty Sand - uniform fine sand, 10% silt in matrix, compact, dry, red
20			SP		Sand - uniform very fine, loose, dry, red, no odor
30			SP		Sand - similar to above
40			SP		Sand - similar to above
50			SP		Sand - siilar to abovve except has 5% medium calcareous nodules
60			SS		Sandstone - medium dense, moderately weathered, calcareous cement, light orange, dry, no odor
70			SP		Gravelly Sand - uniform fine sand, loose, 20% medium calcareous gravel, subrounded, orange, dry, no odor
80			SP		Sand - uniform very fine sand, loose, dry, orange, no odor
90			SP		Sand - similar to above except damp
					Top of Saturation
100			SP		Gravelly Sand -similar to above except 20% fine calcareous gravel, saturated



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MONITOR WELL INSTALLATION

WELL NO.: MW-54A

CLIENT: Fina Oil and Chemical Company JOB NO.: 119505 DATE DRILLED: 3/28/89 SHEET 2 of 2

SITE: Site H/Big Spring, Texas ELEVATION: PAD 2505.56 TOP OF PVC CASING 2507.04

TOTAL DEPTH: 2367.31 CASING SIZE & TYPE: 2 cm OD ¾PVC SCREEN SIZE: 0.010 mill slot

WATER LEVEL : 100.50 REF.: TOC DATE: 4/4/89 TIME: 1110 hrs GEOLOGIST: Robert L. Sherrill

DEPTH	N. VALUE (BLOW/FT.)	POCKET PENETROMETER (TONS/FT^2)	SYMBOL	STRATIGRAPHY	SAMPLE DESCRIPTION
100					
110			GP		Sandy Gravel - uniform fine subrounded calcareous gravel, loose, 40% fine sand, orange, saturated no odor
120			SP		Gravelly Sand - Similar to above except with 40% gravel
130			GP		Gravel - Uniform medium subrounded chert gravel, loose 5% medium snad, tan, saturated, no odor
140			CH		Clay - Highly plastic, hard, red, moist, no odor
150			CH		Clay - Similar to above Boring terminated at 150 feet

COMPLETION DATA

MATERIAL SETTING	MATERIAL DESCRIPTION CONT.
	Cement/ Bentonite Slurry Grout
112	Bentonite Seal
116	
118	Filter Pack
138	
139	Collapse
150	

Casing

Screen

JONES AND NEUSE, INC.
Engineering and Environmental Consultants
Austin Houston Dallas Temple Corpus Christi Chicago

MONITOR WELL CONSTRUCTION

CLIENT: FINA OIL & CHEMICAL CO | JOB NO: 019505.1 | WELL NO. MW–74 | SHEET 1 OF 2
SITE: BIG SPRING, TEXAS | DATE: START: June 4, 1992 | FINISH: June 4, 1992
GEOLOGIST: James D. Shotwell | DRILLER: Dusty Choate | DRILLING RIG TYPE: Failing 1000
DRILLING METHODS: Air Rotary | TOTAL DEPTH: 120 feet | HOLE DIAMETER: 6.75 inches
SITE COORDINATES: 247164.57' N + 790467.96' E | ELEVATIONS: GROUND: NA | PAD: 2505.64 | TOC: 2508.39 | PROT. CSG: 2508.64
WATER LEVEL: DEPTH: 103.13 Feet | DATUM: TOC | DATE: June 19, 1992 | TIME: 7:20 AM

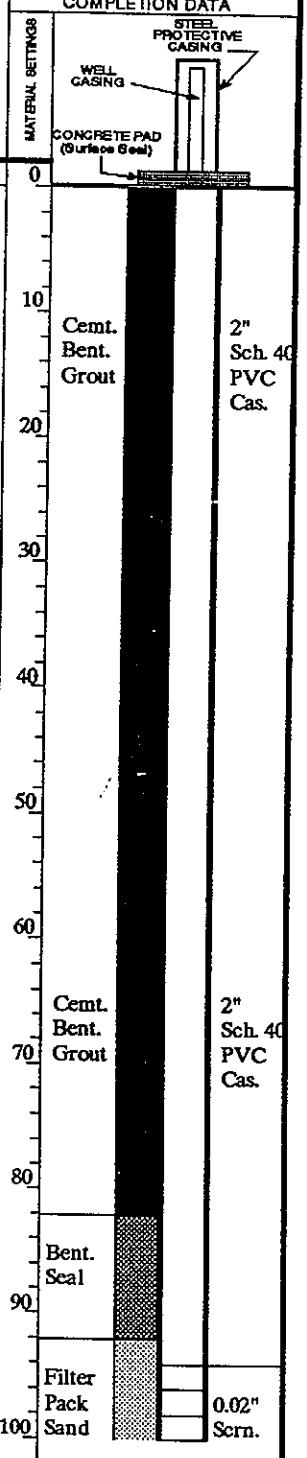
JONES AND NEUSE, INC.
Environmental and Engineering Consultants

LITHOLOGIC DESCRIPTION

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	
0				SP		SAND uniform, fine grained, mod. cemented, red, slightly moist.
10				SP		SAND uniform, fine grained, loose, red, slightly moist.
20				SP		SAND as above.
30				SP		SAND as above.
40				SP		SAND as above.
50				SP		SAND as above.
60				SP		GRAVELLY SAND as above, with <2% GRAVEL fine, loose, calcareous and cherty, white to off–white, dry.
70				SP		SAND uniform, fine grained, loose, red, dry.
80				SP		SAND as above.
90				SP		SAND as above, becoming moist.
						SATURATION @ 95 FEET
100						

(Continued on page 2)

COMPLETION DATA



(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MW–STAND.WK3

MONITOR WELL CONSTRUCTION

CLIENT: FINA OIL & CHEMICAL COMPANY JOB NO: 019505.1 WELL NO. MW-74
SITE: BIG SPRING, TEXAS DATE: START: June 4, 1992 SHEET 2 OF 2 FINISH: June 4, 1992
GEOLOGIST: James D. Shotwell DRILLER: Dusty Choate DRILLING RIG TYPE: Failing 1000
DRILLING METHODS: Air Rotary TOTAL DEPTH: 120 feet HOLE DIAMETER: 6.75 inches
SITE COORDINATES: 247164.57' N + 790467.96' E ELEVATIONS: GROUND: NA PAD: 2505.64 TOC: 2508.39 PROT. CSG: 2508.64
WATER LEVEL: DEPTH: 103.13 Feet DATUM: TOC DATE: June 19, 1992 TIME: 7:20 AM

JONES AND NEUSE, INC.
Environmental and Engineering Consultants

LITHOLOGIC DESCRIPTION

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION
100	X			SP		SAND as above, saturated.
110	X			SP		SAND as above.
120	X			SP		GRAVELLY SAND uniform, fine grained, loose, red, saturated, with <5% GRAVEL calcareous and cherty, loose, fine, dark gray.
						Boring terminated 120 feet below grade.

COMPLETION DATA

MATERIAL SETTINGS

BELOW GRADE MATERIAL COMPLETIONS CONTINUED FROM PREVIOUS PAGE

Filtr. Pack Sand

0.02" Mill Slot Scrn.

(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MW-P2-SC.WK3

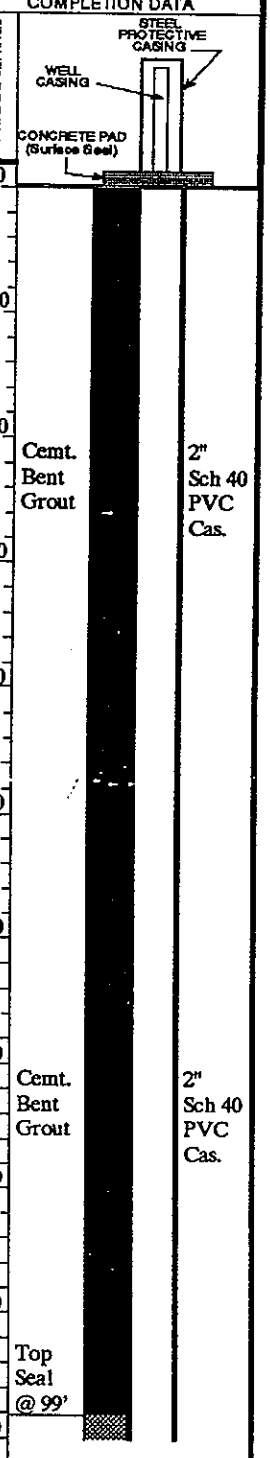
MONITOR WELL CONSTRUCTION

CLIENT: FINA OIL & CHEMICAL CO | JOB NO: 019505.1 | WELL NO. MW-74A | SHEET 1 OF 2
SITE: BIG SPRING, TEXAS | DATE: START: June 3, 1992 | FINISH: June 3, 1992
GEOLOGIST: James D. Shotwell | DRILLER: Dusty Choate | DRILLING RIG TYPE: Failing 1000
DRILLING METHODS: Air Rotary | TOTAL DEPTH: 170 feet | HOLE DIAMETER: 6.75 inches
SITE COORDINATES: 247162.30' N + 790458.62' E | ELEVATIONS: GROUND: NA | PAD: 2505.62 | TOC: 2508.38 | PROT. CSG: 2508.62
WATER LEVEL: DEPTH: 102.44 Feet | DATUM: TOC | DATE: June 19, 1992 | TIME: 7:20 AM

JONES AND NEUSE, INC.
Environmental and Engineering Consultants

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION
0				SP		SAND uniform, fine grained, mod. cemented, red, slightly moist.
10				SP		SAND uniform, fine grained, loose, red, slightly moist.
20				SP		SAND as above.
30				SP		SAND as above.
40				SP		SAND as above.
50				SP		SAND as above.
60				SP		GRAVELLY SAND as above, with <2% GRAVEL fine, loose, calcareous and cherty, white to off-white, dry.
70				SP		SAND uniform, fine grained, loose, red, dry.
80				SP		SAND as above.
90				SP		SAND as above, becoming moist.
						SATURATION @ 95 FEET
100						(Continued on page 2)

COMPLETION DATA



(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MW-STAND.WK3

MONITOR WELL CONSTRUCTION

WELL NO. MW-74A

CLIENT: FINA OIL & CHEMICAL COMPANY JOB NO: 019505.1 SHEET 2 OF 2

SITE: BIG SPRING, TEXAS DATE: START: June 3, 1992 FINISH: June 3, 1992

GEOLOGIST: James D. Shotwell DRILLER: Dusty Choate DRILLING RIG TYPE: Failing 1000

DRILLING METHODS: Air Rotary TOTAL DEPTH: 170 feet HOLE DIAMETER: 6.75 inches

SITE COORDINATES: 247162.30' N + 790458.62' E ELEVATIONS: GROUND: NA PAD: 2505.62 TOC: 2508.38 PROT.CSG: 2508.62

WATER LEVEL: DEPTH: 102.44 Feet DATUM: TOC DATE: June 19, 1992 TIME: 7:20 AM

JONES AND NEUSE, INC.
Environmental and Engineering Consultants

LITHOLOGIC DESCRIPTION

DEPTH (FEET)	USCS SYMBOL (1)		
100	SP	SAND	as above, saturated.
110	SP	SAND	as above.
120	SP	GRAVELLY SAND	uniform, fine grained, loose, red, saturated, with <5% GRAVEL calcareous and cherty, loose, fine dark gray.
130	SP	GRAVELLY SAND	As above, increasing GRAVEL to 10%.
	CH	CLAY (@135')	highly plastic, hard, red, dry.
140	SP	GRAVELLY SAND	uniform, fine grained, loose, red, saturated, with <10% GRAVEL calcareous and cherty, loose, fine, dark gray.
150	CH	TOP DOCKUM CLAY	highly plastic, hard, red, dry.
	CH	TOP DOCKUM CLAY	highly plastic, hard, red, dry.
160	CH	TOP DOCKUM CLAY	highly plastic, hard, red, dry.
170	CH	TOP DOCKUM CLAY	highly plastic, hard, red, dry.
		Boring terminated at 170 feet below grade.	
180			
190			
200			

COMPLETION DATA

BELOW GRADE MATERIAL COMPLETIONS CONTINUED FROM PREVIOUS PAGE

- Bent. Seal
- 2" Sch 40 PVC Cas.
- Filter Pack Sand
- 0.02" PVC Mill Slot Scrn.

(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MW-P2-SC.WK3

MONITOR WELL CONSTRUCTION

WELL NO. MW-75

CLIENT: FINA OIL & CHEMICAL COMPANY JOB NO: 019505.1 SHEET 1 OF 2

SITE: BIG SPRING, TEXAS DATE: START: June 4, 1992 FINISH: June 4, 1992

GEOLOGIST: James D. Shotwell DRILLER: Dusty Choate DRILLING RIG TYPE: Failing 1000

DRILLING METHODS: Air Rotary TOTAL DEPTH: 130 feet HOLE DIAMETER: 6.75 inches

SITE COORDINATES: 247088.75' N + 790222.09' E ELEVATIONS: GROUND: NA PAD: 2506.79 TOC: 2509.54 PROT. CSG: 2509.74

WATER LEVEL: DEPTH: 102.54 Feet DATUM: TOC DATE: June 10, 1992 TIME: 8:40 AM

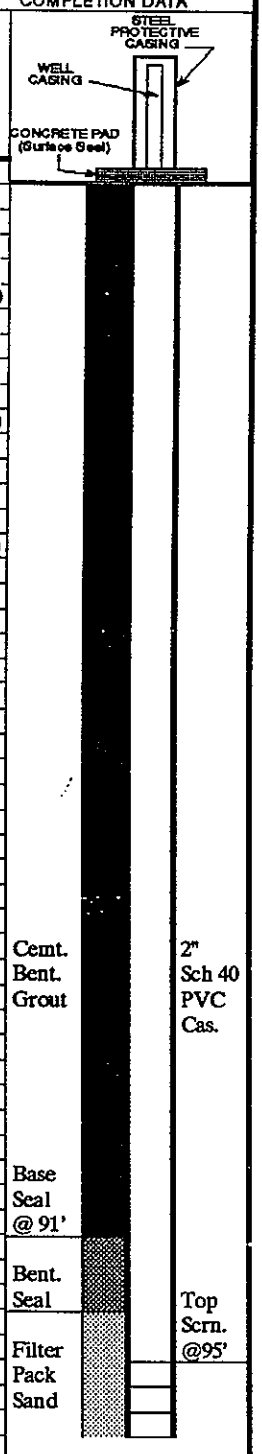
JONES AND NEUSE, INC.
Environmental and Engineering Consultants

LITHOLOGIC DESCRIPTION

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	
0				SP	SAND	uniform, fine grained, loose, red, damp.
10				SP	SAND	As above.
20				SP	SAND	As above.
30				SP	SAND	As above.
40				SP	SAND	As above.
50				SP	SAND	As above.
60				SP	SAND	As above.
70				SP	SAND	As above.
80				SP	SAND	As above.
90				SP	SAND	As above, becoming moist.
100						SATURATION @ 96 FEET

(Continued on page 2)

COMPLETION DATA



(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MW-STAND.WK3

MONITOR WELL CONSTRUCTION

WELL NO. MW-75

CLIENT: FINA OIL & CHEMICAL COMPANY JOB NO: 019505.1 SHEET 2 OF 2

SITE: BIG SPRING, TEXAS DATE: START: June 4, 1992 FINISH: June 4, 1992

GEOLOGIST: James D. Shotwell DRILLER: Dusty Choate DRILLING RIG TYPE: Failing 1000

DRILLING METHODS: Air Rotary TOTAL DEPTH: 130 feet HOLE DIAMETER: 6.75 inches

SITE COORDINATES: 247088.75' N + 790222.09' E ELEVATIONS: GROUND: NA PAD: 2506.79 TOC: 2509.54 PROT. CSG: 2509.74

WATER LEVEL: DEPTH: 102.54 Feet DATUM: TOC DATE: June 10, 1992 TIME: 8:40 AM

JONES AND NEUSE, INC.
Environmental and Engineering Consultants

LITHOLOGIC DESCRIPTION

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	
100				SP	SAND	As above, saturated.
110				SP	SAND	As above.
120				SP	SAND	As above.
130				SP	SAND	As above.
						Boring terminated at 130 feet below grade.

COMPLETION DATA

MATERIAL SETTINGS

BELOW GRADE MATERIAL COMPLETIONS CONTINUED FROM PREVIOUS PAGE

Filter Pack Sand

0.02" PVC Mill Slot Scrn.

Screen set @ 115'

(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MW-P2-SC.WK3

MONITOR WELL CONSTRUCTION

WELL NO. MW-75A

CLIENT: FINA OIL & CHEMICAL COMPANY JOB NO: 019505.1 SHEET 1 OF 2

SITE: BIG SPRING, TEXAS DATE: START: June 4, 1992 FINISH: June 4, 1992

GEOLOGIST: James D. Shotwell DRILLER: Dusty Choate DRILLING RIG TYPE: Failing 1000

DRILLING METHODS: Air Rotary TOTAL DEPTH: 160 feet HOLE DIAMETER: 6.75 inches

SITE COORDINATES: 247091.88' N + 790230.16' E ELEVATIONS: GROUND: NA PAD: 2506.74 TOC: 2509.55 PROT. CSG: 2509.74

WATER LEVEL: DEPTH: 102.97 Feet DATUM: TOC DATE: June 10, 1992 TIME: 8:40 AM

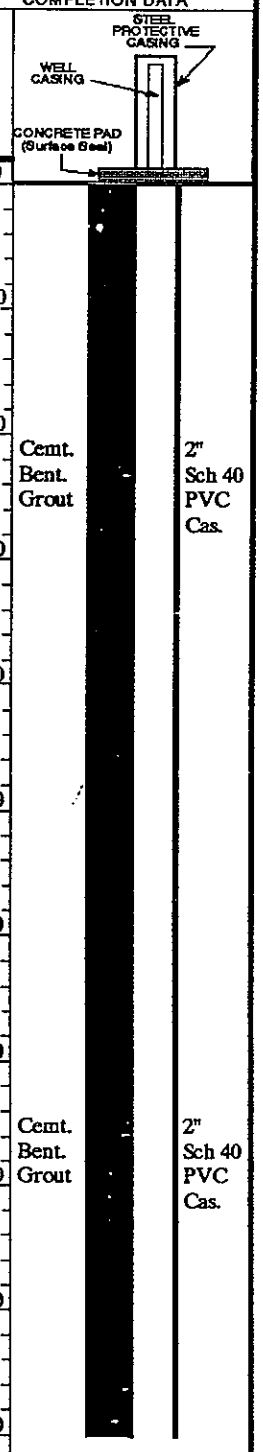
JONES AND NEUSE, INC.
Environmental and Engineering Consultants

LITHOLOGIC DESCRIPTION

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	
0	X			SP		SAND uniform, fine grained, loose, red, damp.
10	X			SP		SAND As above.
20	X			SP		SAND As above.
30	X			SP		SAND As above.
40	X			SP		SAND As above.
50	X			SP		SAND As above.
60	X			SP		SAND As above.
70	X			SP		SAND As above.
80	X			SP		SAND As above.
90	X			SP		SAND As above, becoming moist.
100						SATURATION @ 96 FEET

(Continued on page 2)

COMPLETION DATA



(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MW-STAND.WK3

MONITOR WELL CONSTRUCTION

WELL NO. MW-75A

CLIENT: FINA OIL & CHEMICAL COMPANY JOB NO: 019505.1 SHEET 2 OF 2

SITE: BIG SPRING, TEXAS DATE: START: June 4, 1992 FINISH: June 4, 1992

GEOLOGIST: James D. Shotwell DRILLER: Dusty Choate DRILLING RIG TYPE: Failing 1000

DRILLING METHODS: Air Rotary TOTAL DEPTH: 160 feet HOLE DIAMETER: 6.75 inches

SITE COORDINATES: 247091.88' N + 790230.16' E ELEVATIONS: GROUND: NA PAD: 2506.74 TOC: 2509.55 PROT. CSG: 2509.74

WATER LEVEL: DEPTH: 102.97 Feet DATUM: TOC DATE: June 10, 1992 TIME: 8:40 AM

JONES AND NEUSE, INC.
Environmental and Engineering Consultants

LITHOLOGIC DESCRIPTION

DEPTH (FEET)	USCS SYMBOL (1)	STRATIGRAPHY	
100	SP		SAND As above, saturated.
110	SP		SAND As above.
120	SP		SAND As above.
130	SP		GRAVELLY SAND uniform, fine to very fine grained, loose, red, saturated, with <2% GRAVEL fine, loose, calcareous, cherty, off-white.
140	CH		CLAY highly plastic, hard, red, dry.
	CH		CLAY As above.
150	SP		GRAVELLY SAND uniform, fine to very fine grained, loose, red, saturated, with <20% GRAVEL fine, loose, calcareous, cherty, off-white.
160	CH		TOP DOCKUM CLAY @ 155' highly plastic, hard, red, dry.
			Boring terminated at 160 feet below grade.
170			
180			
190			
200			

COMPLETION DATA

MATERIAL SETTING

BELOW GRADE MATERIAL COMPLETIONS CONTINUED FROM PREVIOUS PAGE

- Cemt. Bent. Grout
- Seal @ 115'
- Bent. Seal
- Filter Pack Sand
- 2" Sch 40 PVC Cas.
- Top Screen @ 135'
- 0.02" PVC Mill Slot Scrn.
- Screen set @ 155'

(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MW-P2-SC.WK3

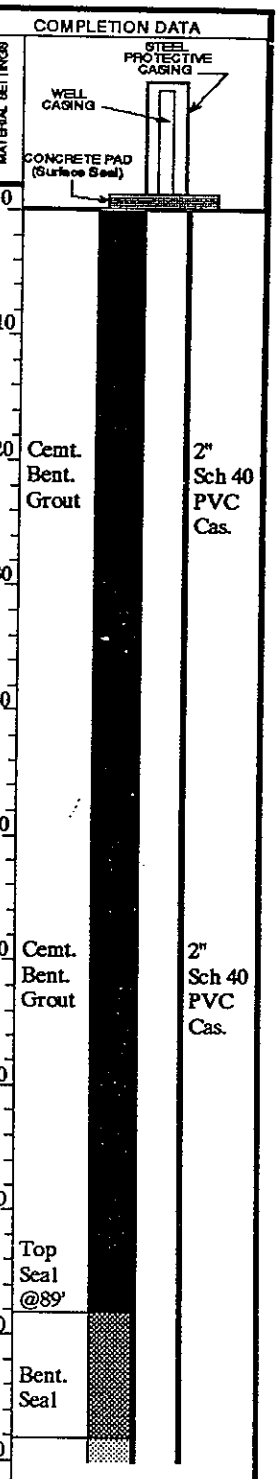
MONITOR WELL CONSTRUCTION

CLIENT: FINA OIL & CHEMICAL COMPANY JOB NO: 019505.1 WELL NO. MW-76
SITE: BIG SPRING, TEXAS DATE: START: June 5, 1992 SHEET 1 OF 2 FINISH: June 5, 1992
GEOLOGIST: James D. Shotwell DRILLER: Dusty Choate DRILLING RIG TYPE: Failing 1000
DRILLING METHODS: Air Rotary TOTAL DEPTH: 130 feet HOLE DIAMETER: 6.75 inches
SITE COORDINATES: 247976.00' N + 790629.76' E ELEVATIONS: GROUND: NA PAD: 2519.47 TOC: 2522.22 PROT. CSG: 2522.47
WATER LEVEL: DEPTH: 116.36 Feet DATUM: TOC DATE: June 11, 1992 TIME: 9:05 AM

JONES AND NEUSE, INC.
Environmental and Engineering Consultants

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION
0				SP		SAND uniform, fine grained, loose, red, moist.
10				SP		SAND as above.
20				SP		SAND as above.
30				SP		SAND as above.
40				SP		SAND as above, dry.
50				SP		GRAVELLY SAND uniform, fine grained, loose, red, dry, with <2% GRAVEL fine, loose, calcareous, cherty, off-white, dry.
60				SP		SAND uniform, fine grained, red, dry.
70				SP		SAND as above.
80				SP		SAND as above.
90				SP		SAND as above.
100				SP		SAND as above, becoming damp.

COMPLETION DATA



(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MW-STAND.WK3

MONITOR WELL CONSTRUCTION

CLIENT: FINA OIL & CHEMICAL COMPANY JOB NO: 019505.1 WELL NO. MW-76
SITE: BIG SPRING, TEXAS DATE: START: June 5, 1992 SHEET 2 OF 2 FINISH: June 5, 1992
GEOLOGIST: James D. Shotwell DRILLER: Dusty Choate DRILLING RIG TYPE: Failing 1000
DRILLING METHODS: Air Rotary TOTAL DEPTH: 130 feet HOLE DIAMETER: 6.75 inches
SITE COORDINATES: 247976.00' N + 790629.76' E ELEVATIONS: GROUND: NA PAD: 2519.47 TOC: 2522.22 PROT. CSG: 2522.47
WATER LEVEL: DEPTH: 116.36 Feet DATUM: TOC DATE: June 11, 1992 TIME: 9:05 AM

JONES AND NEUSE, INC.
Environmental and Engineering Consultants

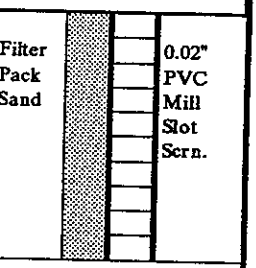
LITHOLOGIC DESCRIPTION

DEPTH (FEET)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION
100	SP		SAND as above, becoming moist.
			SATURTATION @ 101 FEET
	SP		GRAVELLY SAND uniform fine grained, loose, red, saturated with <5% GRAVEL fine, loose, calcareous, cherty, dark gray.
110	SP		SAND uniform, fine grained, loose, red, saturated.
120	SP		SAND as above.
130	SP		SAND as above.
			Boring terminated at 130 feet below grade.
140			
150			
160			
170			
180			
190			
200			

COMPLETION DATA

MATERIAL SETTING

BELOW GRADE MATERIAL COMPLETIONS CONTINUED FROM PREVIOUS PAGE



Screen set @ 120'

(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MW-P2-SC.WK3

MONITOR WELL CONSTRUCTION

WELL NO. MW-76A

CLIENT: FINA OIL & CHEMICAL COMPANY JOB NO: 019505.1 SHEET 1 OF 2

SITE: BIG SPRING, TEXAS DATE: START: June 5, 1992 FINISH: June 5, 1992

GEOLOGIST: James D. Shotwell DRILLER: Dusty Choate DRILLING RIG TYPE: Failing 1000

DRILLING METHODS: Air Rotary TOTAL DEPTH: 180 feet HOLE DIAMETER: 6.75 inches

SITE COORDINATES: 247974.81' N + 790620.73' E ELEVATIONS: GROUND: NA PAD: 2519.14 TOC: 2521.89 PROT. CSG: 2522.14

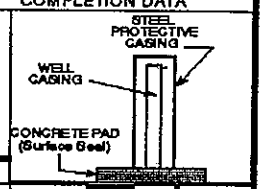
WATER LEVEL: DEPTH: 112.69 Feet DATUM: TOC DATE: June 12, 1992 TIME: 9:05 AM

JONES AND NEUSE, INC.
Environmental and Engineering Consultants

LITHOLOGIC DESCRIPTION

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION
0	X			SP		SAND uniform, fine grained, loose, red, moist.
10	X			SP		SAND as above.
20	X			SP		SAND as above.
30	X			SP		SAND as above.
40	X			SP		SAND as above, dry.
50	X			SP		GRAVELLY SAND uniform, fine grained, loose, red, dry, with <2% GRAVEL fine, loose, calcareous, cherty, off-white, dry.
60	X			SP		SAND uniform, fine grained, red, dry.
70	X			SP		SAND as above.
80	X			SP		SAND as above.
90	X			SP		SAND as above.
100	X			SP		SAND as above, becoming damp.

COMPLETION DATA



MATERIAL SETTINGS		
0		
20	Cemt. Bent. Grout	2" Sch 40 PVC Cas.
80	Cemt. Bent. Grout	2" Sch 40 PVC Cas.

(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MW-STAND.WK3

MONITOR WELL CONSTRUCTION

WELL NO. MW-76A

CLIENT: FINA OIL & CHEMICAL COMPANY JOB NO: 019505.1 SHEET 2 OF 2

SITE: BIG SPRING, TEXAS DATE: START: June 5, 1992 FINISH: June 5, 1992

GEOLOGIST: James D. Shotwell DRILLER: Dusty Choate DRILLING RIG TYPE: Failing 1000

DRILLING METHODS: Air Rotary TOTAL DEPTH: 180 feet HOLE DIAMETER: 6.75 inches

SITE COORDINATES: 247974.81' N + 790620.73' E ELEVATIONS: GROUND: NA PAD: 2519.14 TOC: 2521.89 PROT. CSG: 2522.14

WATER LEVEL: DEPTH: 112.69 Feet DATUM: TOC DATE: June 12, 1992 TIME: 9:05 AM

JONES AND NEUSE, INC.
Environmental and Engineering Consultants

LITHOLOGIC DESCRIPTION

DEPTH (FEET)	USCS SYMBOL (1)	LITHOLOGIC DESCRIPTION
100	SP	SAND as above, becoming moist. SATURTATION @ 101 FEET
	SP	GRAVELLY SAND uniform fine grained, loose, red, saturated with <5% GRAVEL fine, loose, calcareous, cherty, dark gray.
110	SP	SAND uniform, fine grained, loose, red, saturated.
120	SP	SAND as above.
130	SP	SAND as above.
140	SP	SAND as above.
	SP	GRAVELLY SAND uniform, fine grained, loose, red, saturated, with 10% coarse sand and caliche GRAVEL fine, loose, white to off-wh.
150	SP	GRAVELLY SAND as above.
160	CH	TOP DOCKUM CLAY highly plastic, hard,red, dry.
	CH	CLAY as above.
170	CH	CLAY as above.
180	CH	CLAY as above.
		Boring terminated at 180 feet below grade.
190		
200		

COMPLETION DATA

MATERIAL SETTING

BELOW GRADE MATERIAL COMPLETIONS CONTINUED FROM PREVIOUS PAGE

- 2" Sch 40 Pvc Cas.
- Bent. Seal
- Base Seal @ 127'
- Filter Pack Sand
- 0.020" PVC Mill Slot Scrn.

(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MW-P2-SC.WK3

MONITOR WELL CONSTRUCTION

WELL NO. MW-77

CLIENT: FINA OIL & CHEMICAL COMPANY JOB NO: 019505.1 SHEET 1 OF 2

SITE: BIG SPRING, TEXAS DATE: START: June 6, 1992 FINISH: June 6, 1992

GEOLOGIST: James D. Shotwell DRILLER: Dusty Choate DRILLING RIG TYPE: Failing 1000

DRILLING METHODS: Air Rotary TOTAL DEPTH: 130 feet HOLE DIAMETER: 6.75 inches

SITE COORDINATES: 247474.47' N + 790109.49' E ELEVATIONS: GROUND: NA PAD: 2508.82 TOC: 2511.60 PROT. CSG: 2511.82

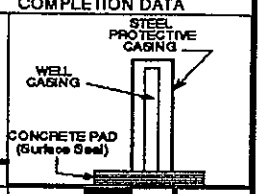
WATER LEVEL: DEPTH: 106.94 Feet DATUM: TOC DATE: June 18, 1992 TIME: 8:30 AM

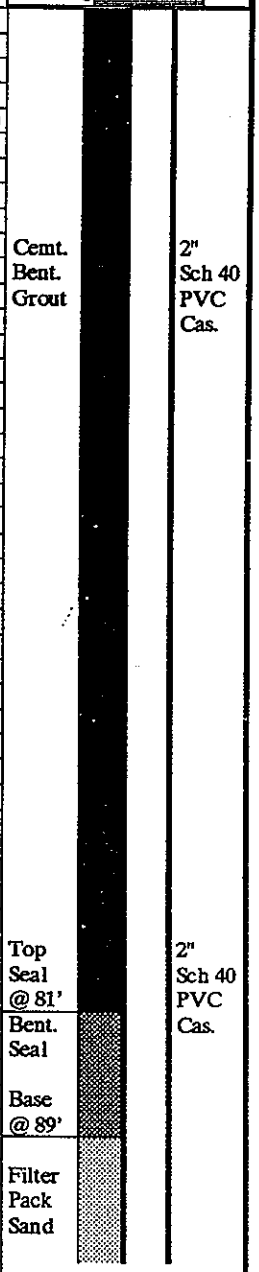
DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION
0				SP		SAND uniform, fine grained, loose to slightly compacted, red, damp.
10				SP		SAND uniform, fine grained, loose, red, damp.
20				SP		SAND as above.
30				SP		SAND as above.
40				SP		SAND as above.
50				SP		GRAVELLY SAND uniform, fine grained, loose, red, dry, with 5% caliche GRAVEL fine, loose, calcareous, cherty, white.
				SP		SAND uniform, fine grained, loose, red, dry.
60				SP		SAND as above.
70				SP		SAND as above.
80				SP		SAND as above.
90				SP		GRAVELLY SAND uniform, fine grained, loose, red, dry, with 5% caliche GRAVEL medium, loose, calcareous, cherty, white.
100						

JONES AND NEUSE, INC. Environmental and Engineering Consultants

(continued on page 2)

COMPLETION DATA





(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MW-STAND.WK3

MONITOR WELL CONSTRUCTION

CLIENT: FINA OIL & CHEMICAL COMPANY JOB NO: 019505.1 WELL NO. MW-77
SITE: BIG SPRING, TEXAS DATE: START: June 6, 1992 SHEET 2 OF 2 FINISH: June 6, 1992
GEOLOGIST: James D. Shotwell DRILLER: Dusty Choate DRILLING RIG TYPE: Failing 1000
DRILLING METHODS: Air Rotary TOTAL DEPTH: 130 feet HOLE DIAMETER: 6.75 inches
SITE COORDINATES: 247474.47' N + 790109.49' E ELEVATIONS: GROUND: NA PAD: 2508.82 TOC: 2511.60 PROT. CSG: 2511.82
WATER LEVEL: DEPTH: 106.94 Feet DATUM: TOC DATE: June 18, 1992 TIME: 8:30 AM

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION
100				SP		SAND uniform, fine grained, loose, red, moist.
						SATURATION @ 101 FEET
110				SP		SAND as above, saturated.
120				SP		SAND as above.
130				SP		SAND as above.
						Boring terminated at 130 feet below grade.

JONES AND NEUSE, INC.
Environmental and Engineering Consultants

COMPLETION DATA

MATERIAL SETTINGS

BELOW GRADE MATERIAL COMPLETIONS CONTINUED FROM PREVIOUS PAGE

Filter Pack Sand

0.020" PVC Mill Slot Scrn.

(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MW-P2-SC.WK3

MONITOR WELL CONSTRUCTION

CLIENT: FINA OIL & CHEMICAL COMPANY JOB NO: 019505.1 WELL NO. MW-77A
SITE: BIG SPRING, TEXAS DATE: START: June 5, 1992 SHEET 1 OF 2 FINISH: June 6, 1992
GEOLOGIST: James D. Shotwell DRILLER: Dusty Choate DRILLING RIG TYPE: Failing 1000
DRILLING METHODS: Air Rotary TOTAL DEPTH: 160 feet HOLE DIAMETER: 6.75 inches
SITE COORDINATES: 247481.83' N + 790113.43' E ELEVATIONS: GROUND: NA PAD: 2509.09 TOC: 2511.89 PROT. CSG: 2512.09
WATER LEVEL: DEPTH: 102.44 Feet DATUM: TOC DATE: June 18, 1992 TIME: 8:30 AM

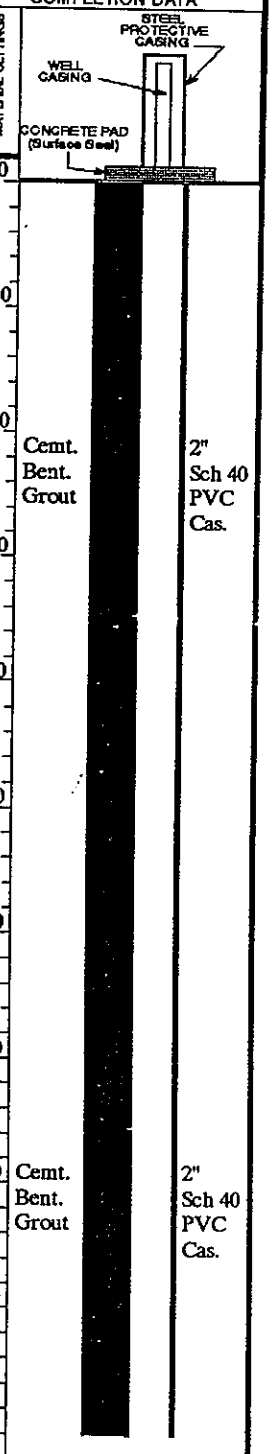
JONES AND NEUSE, INC.
Environmental and Engineering Consultants

LITHOLOGIC DESCRIPTION

DEPTH (FEET)	USCS SYMBOL (1)	LITHOLOGIC DESCRIPTION
0	SP	SAND uniform, fine grained, loose to slightly compacted, red, damp.
10	SP	SAND uniform, fine grained, loose, red, damp.
20	SP	SAND as above.
30	SP	SAND as above.
40	SP	SAND as above.
50	SP	GRAVELLY SAND uniform, fine grained, loose, red, dry, with 5% caliche GRAVEL fine, loose, calcareous, cherty, white.
	SP	SAND uniform, fine grained, loose, red, dry.
60	SP	SAND as above.
70	SP	SAND as above.
80	SP	SAND as above.
90	SP	GRAVELLY SAND uniform, fine grained, loose, red, dry, with 5% caliche GRAVEL medium, loose, calcareous, cherty, white.
100		

(continued on page 2)

COMPLETION DATA



(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MW-STAND.WK3

MONITOR WELL CONSTRUCTION

WELL NO. MW-77A

CLIENT: FINA OIL & CHEMICAL COMPANY JOB NO: 019505.1 SHEET 2 OF 2

SITE: BIG SPRING, TEXAS DATE: START: June 5, 1992 FINISH: June 6, 1992

GEOLOGIST: James D. Shotwell DRILLER: Dusty Choate DRILLING RIG TYPE: Failing 1000

DRILLING METHODS: Air Rotary TOTAL DEPTH: 160 feet HOLE DIAMETER: 6.75 inches

SITE COORDINATES: 247481.83' N + 790113.43' E ELEVATIONS: GROUND: NA PAD: 2509.09 TOC: 2511.89 PROT. CSG: 2512.09

WATER LEVEL: DEPTH: 102.44 Feet DATUM: TOC DATE: June 18, 1992 TIME: 8:30 AM

JONES AND NEUSE, INC.
Environmental and Engineering Consultants

LITHOLOGIC DESCRIPTION

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION
100						
	X			SP		SAND uniform, fine grained, loose, red, moist.
						SATURATION @ 101 FEET
110	X			SP		SAND as above, saturated.
120	X			SP		SAND as above.
130	X			SP		SAND as above.
140	X			CH		CLAY @ 139' highly plastic, dense, red, moist.
	X			SP		SAND uniform, fine grained, loose, red, saturated.
	X			SP		SAND as above.
150	X			SP		GRAVELLY SAND uniform, fine grained, loose, red, saturated, with 10% caliche GRAVEL fine, loose, calcareous, cherty, white.
	X			CH		TOP DOCKUM CLAY highly plastic, hard, red, dry.
160	X			CH		CLAY as above.
						Boring terminated at 160 feet below grade.
170						
180						
190						
200						

COMPLETION DATA

MATERIAL SETTINGS	BELOW GRADE MATERIAL COMPLETIONS CONTINUED FROM PREVIOUS PAGE
100	
110	Cemt. Bent. Grout — 2" Sch 40 PVC Cas.
120	Bent. Seal
130	Base Seal @ 127'
140	Filter Pack Sand — 0.020" PVC Mill Slot Scrn.
150	
160	
170	
180	
190	
200	

(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MW-P2-SC.WK3

ATTACHMENT VI.B.4.A SITE E BORING AND WELL LOGS

SAGE
ENVIRONMENTAL CONSULTING

UNIFIED SOIL CLASSIFICATION SYSTEM

GRADATION AND PLASTICIY CHARACTERISTICS (excluding particles larger than 3 inches)				LABORATORY CONFIRMATION	GROUP SYMBOL	SOIL NAMES
PREDOMINANTLY COARSE-GRAINED > 50% of grains larger than 0.075 mm	GRAVEL > 50% or coarse-grained material is larger than 4.76 mm	CLEAN < 5% fines		D_{60} / D_{10} > 4	GW	Well-graded GRAVEL or SANDY GRAVEL
				Not Meeting Gradation Requirements for GW	GP	Poorly graded, uniform, or gap-graded GRAVEL or SANDY GRAVEL
		WITH FINES > 5% fines		Atterberg Limit below A-Line OR PI < 4	GM	SILTY GRAVEL
				Atterberg Limit above A-Line AND PI < 4	GC	CLAYEY GRAVEL
	SAND > 50% or coarse-grained material is smaller than 4.76 mm	CLEAN < 5% fines		D_{60} / D_{10} > 6	SW	Well-graded SAND or GRAVELLY SAND
				Not Meeting Gradation Requirements for SW	SP	Poorly graded, uniform, or gap-graded SAND or GRAVELLY SAND
		WITH FINES > 5% fines		Atterberg Limit below A-Line OR PI < 4	SM	SILTY SAND
				Atterberg Limit above A-Line AND PI < 4	SC	CLAYEY SAND
PREDOMINANTLY FINE-GRAINED > 50% of grains smaller than 0.075 mm	Plasticity Characteristics of fraction larger than 0.425 mm	SILT Atterberg Limits below A-Line OR PI<4	INORGANIC	Liquid Limit < 50	ML	Non-plastic, slightly plastic, or moderately plastic SILT, CLAYEY SILT, SANDY SILT, or GRAVELLY SILT
				Liquid Limit > 50	MH	Highly plastic or very highly plastic SILT, CLAYEY SILT, SANDY SILT, or GRAVELLY SILT
			ORGANIC	Liquid Limit < 50	OL	Slightly plastic or moderately plastic ORGANIC SILT (ORGANIC CLAY if Atterberg Limit above A-Line)
				Liquid Limit > 50	OH	Highly plastic or very highly plastic ORGANIC SILT (ORGANIC CLAY if Atterberg Limit above A-Line)
		CLAY Atterberg Limits above A-Line AND PI > 7		Liquid Limit < 50	CL	Slightly plastic or moderately plastic CLAY, SILTY CLAY, SANDY CLAY or GRAVELLY CLAY
				Liquid Limit > 50	CH	Highly plastic or very highly plastic CLAY, SILTY CLAY, SANDY CLAY or GRAVELLY CLAY
HIGHLY ORGANIC (identified by spongy feel)					Pt	PEAT

Part B Geology Report

ATTACHMENT VI.4.a

1978 SITE E SOIL BORING LOGS

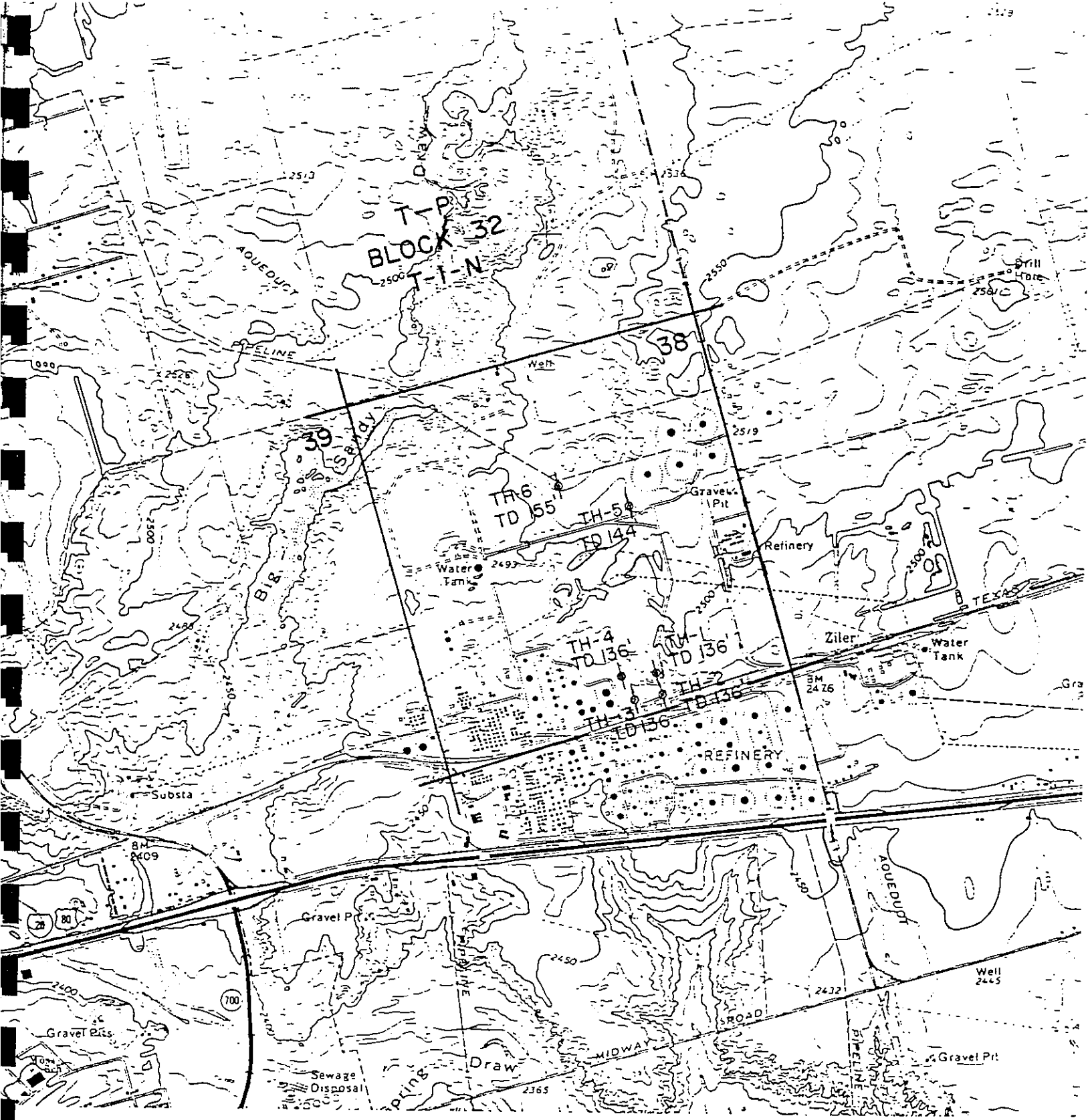


FIGURE 1

HOWARD COUNTY, TEX.

COSDEN OIL & CHEMICAL CO.

"LAND FARM"

"BORE HOLE SURVEY"

11/1978

1"=2000'

ED L. REED & ASSOCIATES INC.

CONSULTING HYDROLOGISTS

MIDLAND & SAN ANGELO, TEXAS

Copyright © 2025 TORO

PROJECT: Cosden Oil and Chemical - Big Spring, Texas

CLIENT: Cosden Oil and Chemical Company

DATE: January 15, 1979

BORING NUMBER	DEPTH (FEET)	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	ATTERBURG LIMITS			COEF. OF PERM (CM/SEC.)	GRAIN SIZE ANALYSIS - MECHANICAL % RETAINED BY WEIGHT								% <200
				LL	PL	PI		SIEVE NO.	4	8	16	30	50	100	200	
1	2-3	11.0	113.	24	16	8	6.7×10^{-6}		0.	0.8	1.2	2.3	17.5	49.8	60.4	39.6
	4-5	6.0	115.	18	18	NP	6.7×10^{-6}		0.	0.	0.	1.8	26.4	69.9	79.2	20.7
	9-10	9.0	120.	19	14	5	1.0×10^{-5}		0.1	0.4	0.5	3.1	29.3	61.4	68.2	31.8
	12-13	4.0		15	15	NP	1.0×10^{-5}		2.1	2.2	2.4	5.4	38.0	76.3	84.4	15.6
	29-30	14.0							0.	0.	0.	1.1	51.1	84.7	89.6	10.4
	39-40	6.0							1.0	1.2	1.3	2.0	22.4	61.3	70.2	29.8
	49-50								0.4	0.9	1.8	3.8	38.1	76.6	88.5	11.5
	69-70								4.2	4.3	4.7	6.5	28.1	70.2	81.0	19.0
2	2-3	7.0	121.	21	17	4	3.6×10^{-6}		0.	0.	0.	1.0	17.9	56.3	68.1	31.9
	4-5	5.0	103.	17	14	3	5.6×10^{-6}		0.	0.	0.	1.8	28.5	71.4	80.3	19.7
	9-10	14.0		14	15	NP	5.9×10^{-6}		4.9	5.9	6.7	17.5	40.7	77.2	86.4	13.6
	14-15	17.0		15	16	NP	1.4×10^{-5}		0.	0.1	0.2	0.5	31.9	86.7	95.0	5.0
	29-30	20.0							0.3	1.2	1.7	6.3	58.0	92.2	95.7	4.3
	44-45	32.0							4.7	6.8	7.4	9.4	28.9	62.6	74.7	25.3
	64-65	20.0							6.6	13.7	16.0	18.9	38.0	78.0	90.0	10.0
	74-75	23.0							1.1	1.6	1.7	3.0	19.4	57.0	74.0	26.0

PROJECT: Cosden Oil and Chemical - Big Spring, Texas

CLIENT: Cosden Oil and Chemical Company DATE: January 15, 1979

BORING NUMBER	DEPTH (FEET)	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	ATTERBURG LIMITS			COEF. OF PERM (CM/SEC.)	GRAIN SIZE ANALYSIS - MECHANICAL % RETAINED BY WEIGHT							% <200
				LL	PL	PI		SIEVE NO.	4	8	16	30	50	100	200
3	2-3	10.0	104.0	23	15	8	6.3×10^{-6}		0.	0.	0.5	2.9	31.7	55.6	63.5	36.5
	4-5	12.0	108.	26	14	12	1.7×10^{-5}		0.	0.	0.	8.7	34.5	58.9	71.9	28.1
	7-8	14.0	116.	23	17	6	1.5×10^{-5}		0.	0.	0.6	2.6	26.5	48.7	63.3	36.7
	15-16	7.0							0.	0.	0.	0.9	24.9	56.7	65.4	34.6
	29-30	10.0							0.	0.	0.	9.4	30.6	55.9	62.9	37.1
	39-40	17.0							0.	0.6	1.3	15.3	39.7	63.8	76.9	23.1
	59-60	8.0							0.	0.	0.5	2.5	11.3	69.9	80.3	19.7
	79-80	57.0							0.	0.	0.	0.8	14.4	58.9	80.6	19.4
4	4-5	13.0	117.	25	15	10	4.7×10^{-6}		0.	0.	0.2	2.9	26.7	71.4	83.1	16.9
	6-7	8.0	122.	22	16	6	9.4×10^{-6}		0.	0.	0.	1.3	23.3	67.3	79.2	20.8
	8-9	7.0		22	16	6	5.6×10^{-6}		0.	0.1	2.3	10.8	54.1	61.7	69.8	30.2
	14-15	3.0							0.	0.2	0.9	25.7	67.7	81.9	82.5	17.5
	29-30	8.0	114.						0.	0.	0.	10.1	37.7	62.5	79.1	20.9
	39-40	20.0							0.	0.	0.9	18.7	39.8	58.9	66.9	33.1
	59-60	28.0							0.	0.	0.	0.3	33.7	61.2	71.5	28.5
	79-80	19.0							0.	0.	0.	0.2	38.8	69.2	75.9	24.1

SOUTHWESTERN LABORATORIES
Rev. 1 07/15/2025 pg. 751

PROJECT: Cosden Oil and Chemical - Big Spring, Texas

CLIENT: Cosden Oil and Chemical Company

DATE: January 15, 1979

BORING NUMBER	DEPTH (FEET)	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	ATTERBURG LIMITS			COEF. OF PERM (CM/SEC.)	GRAIN SIZE ANALYSIS - MECHANICAL % RETAINED BY WEIGHT							%
				LL	PL	PI		SIEVE NO.	4	8	16	30	50	100	200	<200
5	2-3	7.0	113.	20	18	2	1.4×10^{-5}		0.	1.0	3.6	35.4	55.4	78.1	82.3	17.6
	5-6	11.0	118.	24	16	8	5.1×10^{-6}		0.	0.	13.2	41.7	62.9	70.8	74.5	25.5
	9-10	4.0	109.	19	18	1	2.5×10^{-5}		0.	1.1	20.6	42.8	66.6	79.9	81.3	18.6
	14-15	18.0	106.						0.	0.	3.8	20.6	48.1	60.3	76.9	23.1
	24-25	9.0	115.						0.	0.	0.	20.8	49.2	69.3	73.7	26.3
	29-30	10.0							0.	0.	0.	1.2	40.3	58.9	70.1	29.9
	49-50	30.0							0.	0.	0.	0.6	22.8	49.7	62.2	37.8
	64-65	58.0							0.	0.	0.2	1.5	26.3	59.2	68.6	31.4
	84-85	30.0							0.	0.	0.	0.	40.7	53.7	80.6	19.4
6	7-8	1.0		18	18	NP	1.9×10^{-5}		0.	0.	0.	13.2	33.7	66.1	75.8	24.2
	8-9	6.0	112.	21	16	5	6.5×10^{-6}		0.	0.	0.3	1.3	34.6	62.1	72.5	27.5
	14-15	8.0		16	17	NP	1.4×10^{-5}		0.	0.	0.	1.8	35.6	55.2	68.9	31.1
	24-25	16.0							0.	0.	0.	11.6	40.3	58.6	63.5	36.5
	64-65	30.0							0.	3.7	8.9	20.6	28.8	55.3	65.5	34.5
	84-85	35.0							0.	3.9	5.9	11.4	21.7	72.5	81.9	18.1

CLIENT Cosden Oil & Chemical, Howard Co., Tx.

LOCATION NE location of 2 acre tract, 500' n. road/RR; 1900' FEL 550' FSC Sec. 38, Blk 32, T-1-N, T&P

DATE 11/7/78

WELL NUMBER Testhole 1

ELEVATION

S.W.L. 89.00 slumped SLM; 91.0 gl Elec 11/8/7

CASING

PERFORATIONS

DRILLER Southwestern Lab., Arlington, Texas

INTERVAL	DESCRIPTION	POROSITY
0-10	Cored. Ø with air	
0-0.5	100% gray-black sand; m-c quartzitic (oil saturated)	
5-5	95% sand; m-c, round to subround, loose, qtzc. 5% clay; bentonitic	
5-9	90% sand as above s/clay 10% caliche (calcareous lime)	
9-12	80% sand as above s/clay 20% caliche	
12-13	80% 20% caliche increase bentonitic cl	
13-20	95% sand; loose as above v. slight clay matrix 5% caliche	
20	Prep to mud up (bentonitic clay & water)	
20-25	100% sand; loose, m-c, qtzc (clean) Trace caliche	
	(Ø water 150 ppm chlorides)	
25-29	100% sand; m loose	
29-30	(core) 100% sand; loose f-m-c qtzc clean	
30-34	100% as above	
34-35	(core) sand f-m subround to round, loose, clean few streaks gravel up to 2cm	
35-39	100% sand f-m	
39-40	(core) 100% sand f-m as above with streaks calcareous cemented sandstone	
40-44	90% sand f-m 10% calcareous matrix (caliche) v/soft	
44-45	100% sand f-m-c w/calcareous streaks	
45-49	100% sand f-m w/calcareous streaks soft	
49-57	(core) 49-54 sand f-m-c, qtzc, calcareous	
	54-57 sand f-m qtzc highly calcareous firm	
57-65	95% sand f-m-c, qtzc 5% calcareous matrix	
65-75	(core) sand-loose some firmer streaks	
65-69	100% sand f-m tight to loose calcareous	
69-75	100% sand f-m-c loose qtzc s/calcareous	
75-80	100% sand; f-m loose s/argillaceous & calcareous	
80-85	As above	
85-95	As above f-m s/argill & calc	
95-105	100% sand to silt fine grained slightly calcareous	
105-110	100% sand f-m-c loose s/calc	
110-115	100% sand f-m s/calc & slight argill	
115-125	100% sand & silty sand f-m-c s/calcareous & argill	
125-135	(Core) recovered bottom 4' 131-135	
	131-134 white calcareous sandstone soft	
	134-135 red-brown sandy clay w/gravel & sand & misc inclusion	
	135' some gravel dark gray up to 5 cm	
135-136	Red bed	
	Formation water has strong odor of hydrocarbons and chemicals.	

Figure 8.7-2

LOG OF BORING

Page 1 of 2

PROJECT: COSDEN OIL AND CHEMICAL COMPANY
CLIENT: Cosden Oil and Chemical Company
BORING NO.: 1
LOCATION: Big Spring, Texas
DATE: 11/7/78
TYPE: Core
CASED TO:
GROUND ELEVATION:

LEGEND:
SAMPLE
STANDARD PENETRATION
WATER

WATER INFORMATION

DEPTH IN FEET	SYMBOL	SAMPLE	STANDARD PENETRATION BLOWS/ft.	HAND PEN. tsf.	DESCRIPTION OF STRATUM
0					Black and red clayey sand (fill)
10					Reddish tan silty clay (SM-SC)
					Light reddish tan silty clay (SM)
20					Pink clayey sand with caliche nodules (SC)
					Pink sand with caliche nodules (SM)
30					
40					Tan sand with light pink clayey sand with some caliche nodules (SC)
50					Lightly cemented light tan sandstone with tan coarse sand and thin caliche seams (SC)
60					
70					Light reddish tan fine sand with lightly cemented reddish tan sandstone and thin reddish tan clayey sand seams (SC)
80					
90					
100					

SOUTHWESTERN LABORATORIES

LOG OF BORING

Page 2 of 2

PROJECT: COSDEN OIL AND CHEMICAL COMPANY
CLIENT: Cosden Oil and Chemical Company
BORING NO.: 1
LOCATION: Big Spring, Texas
DATE: 11/7/78
TYPE: Core
CASED TO:
GROUND ELEVATION:

LEGEND:
SAMPLE
STANDARD PENETRATION
WATER

WATER INFORMATION

DEPTH IN FEET	SYMBOL	SAMPLE	STANDARD PENETRATION BLOWS/ft.	HAND PEN. tsf.	DESCRIPTION OF STRATUM
110					Light reddish tan fine sand with lightly cemented reddish tan sandstone and thin reddish tan clayey sand seams (SC)
120					
130					Reddish tan limy clayey sand with reddish tan dense sand (SC)
					Reddish tan clayey sand with sand and gravel (SC and GW)
140					Red shale
150					Bottom of boring at 145'
160					
170					
180					
190					
200					

SOUTHWESTERN LABORATORIES

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Figure 8.7-1

CLIENT Cosden Oil & Chemical, Howard Co, Tex.
LOCATION 1900' FEL 30' FSL, Sec. 38, Blk 32, T-1-N, T&P
DATE 11/8/78
WELL NUMBER Testhole 2 (2 acre tract SE loc.)
ELEVATION

S.W.L. 86.3 11/9/78 2" 1.4' abgl.
CASING Set 2" PVC 0' to 136'
PERFORATIONS Slots 116' to 136'
DRILLER James Dotson-Southwestern Labs.
Arlington, Texas

INTERVAL	DESCRIPTION	POROSITY
0-1	(core) 100% red-brown sand: m-c round qtz, loose to lightly cemented w/old oil saturation, s/odor, s/bentonitic, Ø water 180 ppm chlorides	
1-2	(core) 100% lt. red sand: as above very loose s/trace clay	
2-3	(core) red to deep orange; as above	
3-4	(core) 100% red sand; f-m-c qtzc loose w/oil saturation v.s. odor s/bentc	
4-5	(core) 100% lt. red sand; f-m-c qtzc very loose	
5-6	(core) As above	
6-7	(core) 100% tan-lt. red sand; f-m-c qtzc loose, round s/calcareous s/bentc	
7-8	(core) 100% tan-pink sand	
8-9	(core) As above	
9-10	(core) 100% tan-pink sand; loose f-m & some coarse, round to subround, qtzc s/calc	
10-14	NS	
14-15	(core) 100% pink sand; loose f-m-c as above	
15-19	100% pink sand; loose f-m-c as above	
19-20	(core) as above f-m	
20-24	100% pink sand; as above	
24-25	100% pink-tan sand; as above	
25-29	100% as above	
29-34	100% as above	
34-35	100% as above	
35-39	NS	
39-40	100% pink f-m-c increase fine multicolored qtzc as above	
40-44	As above	
44-45	(core) limited sample white-tan calcareous f-m sand	
45-49	As above	
49-50	100% sand; f-m calcareous loose	
50-54	As above	
54-55	(core) 100% sand: pink f-m s/calcareous	
55-59	100% as above	
59-60	As above	
60-64	As above	
64-65	(core) 100% sand; f-m v/calcareous	
65-69	100% as above	
69-70	100% sand f-m s/calcareous	
70-74	100% as above	
74-75	(core) 100% sand f-m calcareous	
75-80	100% sand; f-m-c loose s/calcareous	
80-85	100% sand as above	
85-90	100% sand; pink fine some med, loose s/calcareous s/bentc. silty streaks	
90-94	As above	
94-95	100% sand; pink-tan mostly fine-some med & coarse s/cemented calcareous matrik	
95-100	As above few streaks silty sand	
100-105	As above fine sand to s/silty	
105-114	100% sand; f-m-c loose w/streaks of argillaceous silty sand	

CLIENT *Cosden Oil & Chemical, Howard Co, Tex.* S.W.L.

LOCATION CASING

DATE PERFORATIONS

WELL NUMBER *Testhole 2 (CONTINUED)* DRILLER

ELEVATION

INTERVAL	DESCRIPTION	POROSITY
114-115	75% sand f-m 25% silty gray clay very calcareous	
115-124	100% sand; pmk-gray, f-m to silty s/argill s/calc	
124-125	50% as above 50% brown-red sandy clay	
125-130	100% pink sand some silty clay	
130-134	100% coarse sand & fine gravels up to 5mm loose	
134-136	Red sticky clay	
TD	136'	

LOG OF BORING

Page 1 of 2

PROJECT: COSDEN OIL AND CHEMICAL COMPANY
CLIENT: Cosden Oil and Chemical Company
BORING NO.: 2
LOCATION: Big Spring, Texas
DATE: 11/8/78
TYPE: Core
CASED TO:
GROUND ELEVATION:

DEPTH IN FEET	SYMBOL	SAMPLE	STANDARD PENETRATION BLOWS/ft.	HAND PEN. tsf.	DESCRIPTION OF STRATUM
					Reddish brown sandy clay (SM)
10					Reddish tan sandy clay (SM)
					Light reddish tan coarse sand with caliche nodules (SW-SM)
20					
30					
40					
					Light tan and pink clayey sand with some caliche nodules (SC)
50					
60					
70					Reddish tan fine sand with caliche nodules (SM)
80					
90					
100					

LEGEND:
- SAMPLE
- STANDARD PENETRATION
- WATER

WATER INFORMATION

SOUTHWESTERN LABORATORIES

LOG OF BORING

Page 2 of 2

PROJECT: COSDEN OIL AND CHEMICAL COMPANY
CLIENT: Cosden Oil and Chemical Company
BORING NO.: 2
LOCATION: Big Spring, Texas
DATE: 11/8/78
TYPE: Core
CASED TO:
GROUND ELEVATION:

DEPTH IN FEET	SYMBOL	SAMPLE	STANDARD PENETRATION BLOWS/ft.	HAND PEN. tsf.	DESCRIPTION OF STRATUM
110					Reddish tan fine sand with caliche nodules (SM)
120					Reddish tan and gray sand with small gravel (SP)
130					
					Red shale
140					Bottom of boring at 136'
150					
160					
170					
180					
190					
200					

LEGEND:
- SAMPLE
- STANDARD PENETRATION
- WATER

WATER INFORMATION

SOUTHWESTERN LABORATORIES

Figure 8.7-3

SAMPLE DESCRIPTION:

CLIENT Cosden Oil & Chemical, Howard Co, Tex

LOCATION 2100' FEL 30' FSL Sec. 38, Blk 32, T-1-N, T&P

DATE 11/9/78

WELL NUMBER Testhole 3 (325' west TH 2)

ELEVATION

S.W.L. 76.02 gl - slumped at 79

CASING

PERFORATIONS

DRILLER Southwestern Lab.

INTERVAL	DESCRIPTION	POROSITY
0-2	100% sand; brown-red m-c, qtzc loose to lightly argillaceous (bentc) oil saturated	
2-5	100% sand; red m-c qtzc loose s/argillaceous s/oil saturated	
5-7	as above	
7-10	100% sand; red m-c loose s/argill heavy oil saturated	
10-12	100% sand; pink m-c loose clean	
12-15	100% f-m-c loose trace oil	
15-20	100% as above clean	
20-25	100% f-m-c loose clean	
25-30	100% m-c loose to s/argill	
30-34	NS	
34-35	(core) 100% sand f-m cemented w/calcareous matrix	
35-40	100% sand; f-m s/calcareous (Core)	
40-45	As above (Core)	
45-50	100% sand f-m much caliche inclusion (calcareous) (Core)	
50-55	100% as above f-m to some coarse (Core)	
55-60	100% as above (Core)	
60-65	100% as above (Core)	
65-70	100% sand f-m loose s/calcareous	
70-75	100% sand as above inc. calcareous (caliche)	
75-80	100% as above	
80-85	100% as above	
85-90	as above fine to silty	
90-95	100% as above	
95-100	as above	
100-105	as above	
105-110	as above	
110-115	60% sand f-m-c 40% caly; white-gray calcareous & sandy	
115-120	100% clay sandy red, gray to white bentonitic	
120-125	100% gravel, loose up to 3 cm red, black qtz, sandstone (tertiary-ogallala)	
125-130	100% red sandy clay	
	T-Redbeds 124'	

LOG OF BORING

Page 1 of 2

PROJECT: COSDEN OIL AND CHEMICAL COMPANY
CLIENT: Cosden Oil and Chemical Company
BORING NO.: 3
LOCATION: Big Spring, Texas
DATE: 11/9/78
TYPE: Core
CASED TO:
GROUND ELEVATION:

LEGEND:
- SAMPLE
- STANDARD PENETRATION
- WATER

WATER INFORMATION

DEPTH IN FEET	SYMBOL	SAMPLE	STANDARD PENETRATION BLOWS/ft.	HAND PEN. tsf.	DESCRIPTION OF STRATUM
					Black and red clayey sand (fill)
					Reddish tan clayey sand (SM-SC)
10					Reddish tan silty sand (SM-SC)
20					
30					
					Light reddish tan sand with caliche nodules (SC)
40					
50					
60					
70					
80					
90					Reddish tan coarse sand with tan sand (SP)
100					

SOUTHWESTERN LABORATORIES

LOG OF BORING

Page 2 of 2

PROJECT: COSDEN OIL AND CHEMICAL COMPANY
CLIENT: Cosden Oil and Chemical Company
BORING NO.: 3
LOCATION: Big Spring, Texas
DATE: 11/9/78
TYPE: Core
CASED TO:
GROUND ELEVATION:

LEGEND:
- SAMPLE
- STANDARD PENETRATION
- WATER

WATER INFORMATION

DEPTH IN FEET	SYMBOL	SAMPLE	STANDARD PENETRATION BLOWS/ft.	HAND PEN. tsf.	DESCRIPTION OF STRATUM
					Reddish tan coarse sand with tan sand (SP).
110					Reddish tan and gray clayey sand with gray coarse sand (SP-SC)
120					Tan sand and gravel with gray and tan clayey sand seams (SW-SC)
130					Red shale
140					Bottom of boring at 130'
150					
160					
170					
180					
190					
200					

SOUTHWESTERN LABORATORIES

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Figure 8.7-5

SAMPLE DESCRIPTION

CLIENT Cosden Oil & Chemical, Howard Co, Tex

LOCATION 755 FSL & 2100'+FEL, Sec. 38, Blk. 32, T-1-N, T&P, NW corner 2 acre tr. 150' N. quarry

DATE 11/9/78

WELL NUMBER Testhole 4

ELEVATION

S.W.L. 76.0 gl after 1 hr.

CASING

PERFORATIONS

DRILLER Southwestern Lab, James Dotson, Arlington, Texas

INTERVAL	DESCRIPTION	POROSITY
0-10	Ø air 10 to TD Ø bentc-mud	
0-1	100% lt. brown m-c loose qtzc clean sand light oil saturation	
1-4	100% black as above (cemented w/oil) v heavy oil-asphalt saturation	
4-5	100% brown to red f-m-c s/bentonitic medium oil saturation	
5-9	100% red m-c loose s/bentonitic	
10-12	As above	
12-13	100% as above (Core)	
13-14	As above	
14-15	100% sand f-m-c tan-pink qtzc loose clean s/bentonitic matrix (Core)	
15-19	As above	
19-20	100% sand f-m-c pink qtzc loose clean s/bentc (Core)	
20-24		
24-25	100% sand m-c pink-red qtzc loose s/bentc matrix (Core)	
25-29		
29-30	100% sand f-m lt. pink to tan s/cemented in calcareous matrix	
30-35	100% sand f-m-c pink s/calcareous streaks s/bentc (Core)	
35-40	100% sand f-m s/calc streaks s/bentc	
40-45	100% sand f-m-c s/calcareous	
45-50	100% sand f-m-c s/calcareous streaks s/bentc	
50-60	100% as above	
60-70	100% as above m-c	
70-80	100% as above calc streaks some bentc clay	
80-85	100% f-m-c	
85-95	100% sand; m-c loose s/calc.	
95-105	100% sand f-m trace dark gray sandy clay	
105-110	60% sand m-c loose 40% gray sandy soft clay (odor-oil)	
110-115	30% sand m-c loose 80% gray sandy clay (odor)	
115-120	90% sand m-c some f gravel multicolored 10% gray clay & white clay	
120-125	75% sand trace gravel 25% clay	
125-128	100% sand m-c & some f gravel 2 cm (cherts, sands & fossils, gravels)	
128-136	Redbed	
	TD - 136'	

LOG OF BORING

Page 1 of 2

PROJECT: COSDEN OIL AND CHEMICAL COMPANY
CLIENT: Cosden Oil and Chemical Company
DATE: 1/9/78 TYPE: Core CASED TO: GROUND ELEVATION:
BORING NO.: 4
LOCATION: Big Spring, Texas

DEPTH IN FEET	SYMBOL	SAMPLE	STANDARD PENETRATION BLOWS/ft.	HAND PEN. tsf.	DESCRIPTION OF STRATUM
					Black clayey sandy, sandy clay, and sand (SM-SC)
10					Reddish tan clayey sand (SM-SC)
20					
30					Pink sand, clayey sand with some soft caliche nodules (SC-SM)
40					
50					
60					
70					
80					
90					Reddish tan clayey sand with some caliche nodules (SC)
100					Reddish tan and gray clayey sand (SC)
					(see next page)

LEGEND: SAMPLE; STANDARD PENETRATION; WATER

WATER INFORMATION

SOUTHWESTERN LABORATORIES

LOG OF BORING

Page 2 of 2

PROJECT: COSDEN OIL AND CHEMICAL COMPANY
CLIENT: Cosden Oil and Chemical Company
DATE: 11/9/78 TYPE: Core CASED TO: GROUND ELEVATION:
BORING NO.: 4
LOCATION: Big Spring, Texas

DEPTH IN FEET	SYMBOL	SAMPLE	STANDARD PENETRATION BLOWS/ft.	HAND PEN. tsf.	DESCRIPTION OF STRATUM
110					Gray sandy and clayey shale with gravel and coarse light tan sand
120					
					Light tan coarse sand with large gravel (GP-SP)
130					Red shale
140					Bottom of boring at 136'
150					
160					
170					
180					
190					
200					

LEGEND: SAMPLE; STANDARD PENETRATION; WATER

WATER INFORMATION

SOUTHWESTERN LABORATORIES

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Figure 8.7-7

T Cosden Oil & Chemican, Howard Co, Tex

ION SE Corner 11 ac tr.

11/10/78

NUMBER Testhole 5

LOCATION

S.W.L. 97.9 top pipe 1' ab gl

CASING 2"

PERFORATIONS At bottom:

DRILLER Southwestern Lab

RVAL	DESCRIPTION	POROSITY
-10	Sand w/just enough clay to clod	
15	Sand, CS w/20 clay	
5-20	Sand, CS	
-25	Sand, enough clay to clod	
30	Sand w/some white & red clay (30-40%)	
0-35	Sand, fine calc w/some clay	
-40	Sand, red, med to cs, clean	
45	Sand as above	
50	70% do 20% cl 10% ss	
0-55	70% do fine 30% cl	
56	Ran Shelby - sand, red med, tr. cl.	
60	Sand, red 70% 30% clay, white sly/calc.	
0-65	Cly, sandy, silty bentc 50/50	
69	Sand, tr. cl	
72	Sand, cs, packed, enough cl to keep core solid	
2-75	Sand, crumbly core, very little clay	
80	Sand, fine to cs, wh. trace clay	
	Sand, clay 50/50, silty	
5-90	Sandy clay 100%, tan bentonitic	
-95	70% sand 30% clay	
100	100% sand, med brown	
-105	100% do, trace clay	
5-115	80% do 20% cl	
120	do	
125	80% do w/ss 20% cl	
5-130	50% do 50% do	
131	60% do 40% do	
140	Gravel	
0-144	Gravel med, qrtz, ls	
	144-Redbed	

. REED & ASSOCIATES, INC.
.TING HYDROLOGISTS
D-SAN ANGELO, TEXAS

LOG OF BORING

Page 1 of 2

PROJECT: COSDEN OIL AND CHEMICAL COMPANY
CLIENT: Cosden Oil and Chemical Company
BORING NO.: 5
LOCATION: Big Spring, Texas
DATE: 11/10/78
TYPE: Core
CASED TO:
GROUND ELEVATION:

LEGEND:
- SAMPLE
- STANDARD PENETRATION
- WATER

WATER INFORMATION

DEPTH IN FEET	SYMBOL	SAMPLE	STANDARD PENETRATION BLOWS/ft.	HAND PEN. tsf.	DESCRIPTION OF STRATUM
0					Light reddish tan sand (SM)
10					Reddish tan clayey sand (SC)
20					Reddish tan coarse sand with caliche nodules (SP)
30					
40					
50					
60					Reddish tan clayey sand (SC)
70					Reddish tan coarse sand (SP)
80					
90					
100					

SOUTHWESTERN LABORATORIES

LOG OF BORING

Page 2 of 2

PROJECT: COSDEN OIL AND CHEMICAL COMPANY
CLIENT: Cosden Oil and Chemical Company
BORING NO.: 5
LOCATION: Big Spring, Texas
DATE: 11/10/78
TYPE: Core
CASED TO:
GROUND ELEVATION:

LEGEND:
- SAMPLE
- STANDARD PENETRATION
- WATER

WATER INFORMATION

DEPTH IN FEET	SYMBOL	SAMPLE	STANDARD PENETRATION BLOWS/ft.	HAND PEN. tsf.	DESCRIPTION OF STRATUM
110					Reddish tan coarse sand (SP)
120					
130					
140					Tan coarse sand with gravel (GP-SP)
150					Red shale
160					Bottom of boring at 146'
170					
180					
190					
200					

SOUTHWESTERN LABORATORIES

Figure 8.7-9

Cosden Oil & Chemical, Howard Co, Tex

NW corner 11 ac. landform site

11/11/78

Testhole 6

S.W.L. Could not measure

CASING None

PERFORATIONS None

DRILLER Southwestern Labs

INTERVAL	DESCRIPTION	POROSITY
1	Blow sand	
2	" "	
2-3	" "	
3-4	" "	
4-5	" "	
5-6	" "	
6-7	" "	
7-8	Sand, med w/enough clay to clod & form Shelby core	
8-9	Sand, med-cs, w/enough clay to clod & form Shelby core	
9-10		
10-12		
12-13	Sand, silty fine brown, trace clay	
13-15	Sand, coarse brown	
15-20	Sand, coarse-brown & medium, based upon drive spl 19-20	
20-25	80% do 20% clay, brown	
25-30	Coarse clean sand based upon drive spl 29-30	
30-34	do caught spls	
34-35	Clean coarse sand	
35-39	do did not stop to core - no clays apparent	
39-55	Clean cs sand - no clay	
	- Had to mud up -	
55-60	Very coarse clean sand	
60-65	Sand w/clay 50/50 wh. caliche trace	
65-67	do	
67-72	Sand, trace to 20% clay	
72-80	Sand, coarse to med.	
80-85	Sandy clay, tan	
85-90	No samples	
90-95	50% sand & ss 50% clay	
95-100	do Poor returns	
100-105	do Poor returns	
105-110	do Poor returns	
110-115	Sandy med, trace clay	
115-120	Sand, trace clay	
120-125	Sand & clay 60-40	
120-130	Sand, fine tan; some ss	
130-135	Do; some clay	
135-145	Sand; some ss, trace clay	
145-155	Gravel, had trouble getting sample up	
	Redbed	

Figure 8.7-1

LOG OF BORING

Page 1 of 2

PROJECT: COSDEN OIL AND CHEMICAL COMPANY
CLIENT: Cosden Oil and Chemical Company
BORING NO.: 6
LOCATION: Big Spring, Texas
DATE: 11/10/78 TYPE: Core CASED TO: GROUND ELEVATION:

LEGEND: SAMPLE, STANDARD PENETRATION, WATER

DEPTH IN FEET	SYMBOL	SAMPLE	STANDARD PENETRATION BLOWS/ft.	HAND PEN. tsf.	WATER INFORMATION / DESCRIPTION OF STRATUM
0					Reddish tan sand (SM)
5					Reddish tan clayey sand (SM)
10					Reddish tan coarse sand (SP)
20					
30					Pink sand and clayey sand with caliche nodules (SC)
40					Light tan coarse sand (SP)
50					Reddish tan sand with some caliche nodules and thin reddish tan clayey sand seams (SM-SC)
60					
70					
80					Reddish tan fine sand (SM)
90					Reddish tan sand (SP)
100					

SOUTHWESTERN LABORATORIES

LOG OF BORING

Page 2 of 2

PROJECT: COSDEN OIL AND CHEMICAL COMPANY
CLIENT: Cosden Oil and Chemical Company
BORING NO.: 6
LOCATION: Big Spring, Texas
DATE: 11/10/78 TYPE: Core CASED TO: GROUND ELEVATION:

LEGEND: SAMPLE, STANDARD PENETRATION, WATER

DEPTH IN FEET	SYMBOL	SAMPLE	STANDARD PENETRATION BLOWS/ft.	HAND PEN. tsf.	WATER INFORMATION / DESCRIPTION OF STRATUM
110					Reddish tan sand (SP)
120					
130					
140					
150					Reddish tan sand and gravel with reddish tan clayey sand (SP-SC)
160					Red shale
170					Bottom of boring at 166'
180					
190					
200					

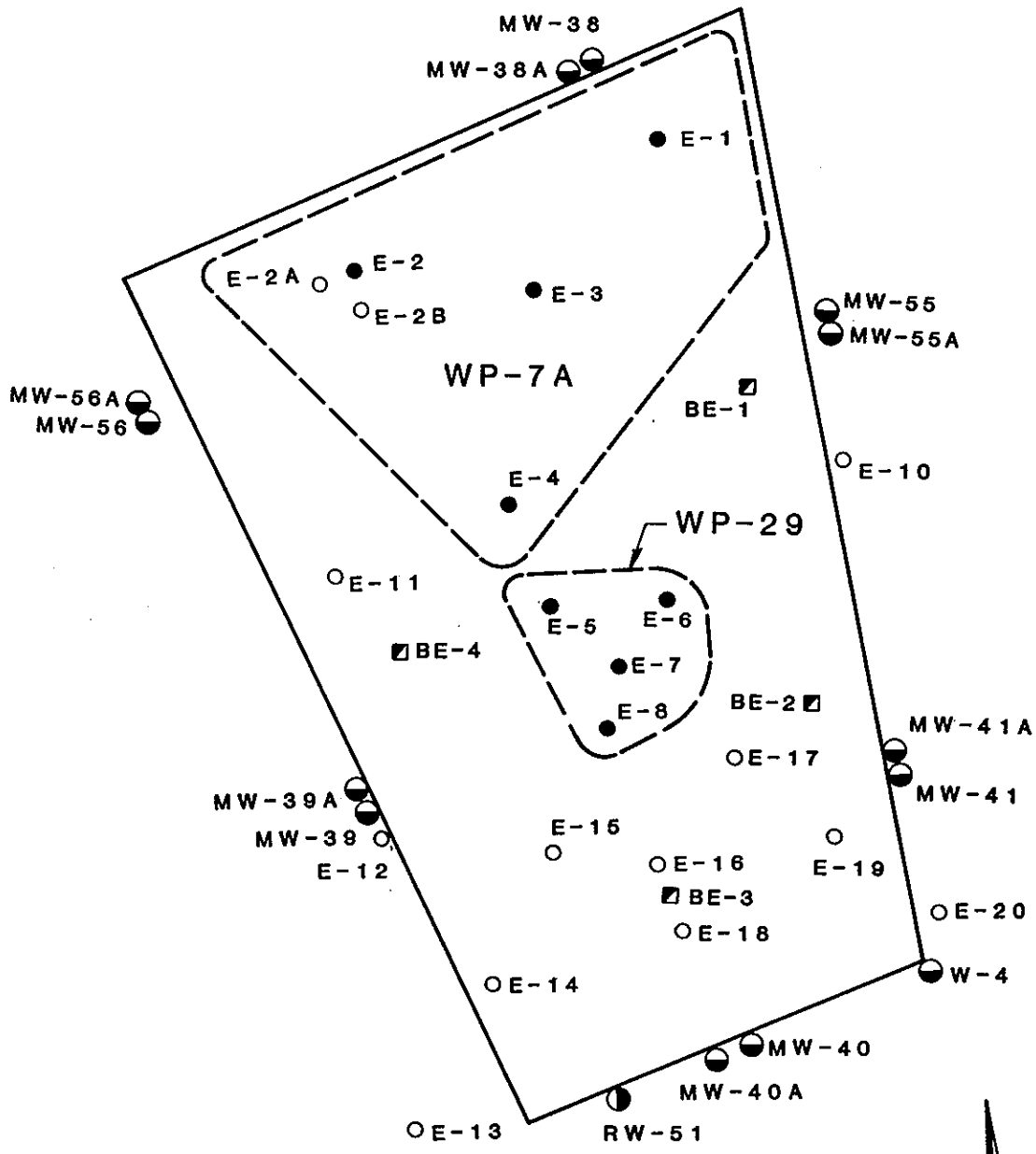
SOUTHWESTERN LABORATORIES

Figure 8.7-10

Part B Geology Report

ATTACHMENT VI.4.a

1989 PHASE I
SITE E SOIL BORING LOGS



LEGEND

- PRELIMNARY SOIL BORINGS, 9/1/88
- PHASE I SOIL BORINGS, 8/18/89
- PHASE II SOIL BORINGS, 10/10/89
- EXISTING MONITOR WELL
- EXISTING RECOVERY WELL

SCALE IN FEET

0 50 100 200

D900015

FIGURE 2

SOIL BORINGS
FOR THE SITE E LTU
FINA OIL & CHEMICAL COMPANY

JONES AND NEUSE, INC.
Engineering and Environmental Consultants

LOG OF BORING

BORING NO.: B-E-1

CLIENT: FINA OIL AND CHEMICAL COMPANY JOB NO. 119505 SHEET 1 of 1

SITE: Big Spring, Texas DATE: START 9-1-88 FINISH 9-1-88

GEOLOGIST: Robert L. Sherrill DRILLER: Choate Well Service DRILL RIG TYPE: Failing 1250

MEASURED GROUNDWATER LEVEL: DEPTH N/A DATE N/A TIME N/A REF. N/A

DRILLING METHODS: Air Rotary Ground level Elevation (MSL) = 2492.23 feet

COMMENTS: Base of Visible Contamination 3.9', Base of Odor 11.0', Top of Saturation at 92.3'

ELEVATION (FT.MSL)	DEPTH (FT.)	SAMPLE TYPE (1)	SAMPLE NO.	RECOVERY (2)	SPT N VALUE (3)	SYMBOL (4)	STRATIGRAPHY	SAMPLE DESCRIPTION	POCKET PENETROMETER TON/FT.2	% PASSING NO. 200 SIEVE	MOISTURE CONTENT NATURAL	MOISTURE CONTENT LIQ. LIMIT	MOISTURE CONTENT PLAS. INDEX
	0												
			1	1.5		SP		SAND uniform very fine sand, loose, black, damp, strong odor			12.9		
								Base of Visible Contamination					
						SP		SAND uniform very fine sand, loose, red, dry, slight odor					
	10							Base of Odor					
			2	1.5		SP		SAND uniform very fine to fine sand, loose, light red, 5% calcareous cement (very poor) dry, no odor			4.5		
	20												
			3	1.5		SP		SAND similar to above except <5% fine to medium calcareous gravel, subangular, no odor			4.0		
	30												
			4	1.5		SP		SAND similar to above except no gravel, no odor			0.7		
	40												
			5	1.5		SP		SAND similar to above except 10% calcareous cement (poor), no odor			8.7		
	50												
			6	1.5		SP		SAND similar to above, no odor			10.8		
						SS		SANDSTONE uniform very fine, dense, well cemented (calcareous) dry					
	60												
			7	1.5		SP		SAND uniform very fine, compact, 10% calcareous cement (poor) dry, no odor			6.1		
	70												
			8	1.5		SP		SAND uniform fine, loose, dry, no odor			12.8		
	80												
			9	1.5		SP		SAND similar to above, no odor			9.8		
	90												
								Top of Saturation					
			10	1.5		SP		SAND similar to above except saturated, strong odor			15.6		
								Boring Terminated at 95.5 feet					
	100												

(1) SHELBY TUBE,SPLIT SPOON,ROCK CORE,or GRAB
(2) LENGTH OF SAMPLE RECOVERED
(3) STD. PENETRATION RESISTANCE BLOWS/FT
(4) UNIFIED SOIL CLASSIFICATION SYSTEM

LOG OF BORING

BORING NO.: B-E-2

CLIENT: FINA OIL AND CHEMICAL COMPANY JOB NO. 119505 SHEET 1 of 1

SITE: Site E / Big Spring, Texas DATE: START 9-7-88 FINISH 9-7-88

GEOLOGIST: Robert L. Sherrill DRILLER: Dusty Choate DRILL RIG TYPE: Failing 1250

MEASURED GROUNDWATER LEVEL: DEPTH ____ DATE ____ TIME ____ REF. ____

DRILLING METHODS: Air Rotary Ground level elevation (MSL) = 2488.40 feet

COMMENTS: Base of Visible Contamination 10.2 feet/ Base of Odor 15.1 feet/ Base of Temporary Casing 15.5 feet

ELEVATION (FT.MSL)	DEPTH (FT.)	SAMPLE TYPE (1)	SAMPLE NO.	RECOVERY (2)	SPT N VALUE (3)	SYMBOL (4)	STRATIGRAPHY	SAMPLE DESCRIPTION	POCKET PENETROMETER TON/FT.^{2}	% PASSING NO. 200 SIEVE	MOISTURE CONTENT: NATURAL	MOISTURE CONTENT: LIQ. LIMIT	MOISTURE CONTENT: PLAS. INDEX
	0												
		X	11	1.5		SP		SAND uniform ver fine, loose, black, very strong odor, moist			22.4		
	10	X	12	1.5		SP		SAND uniform very fine, loose, red, strong odor, dry					
	20	X	13	1.5		SP		SAND uniform fine, loose, red, dry, no odor			1.7		
	30	X	14	1.5		SP		SAND similar to above except moist, no odor			29.7		
	40	X	15	1.5		SP		SAND similar to above, no odor			2.6		
	50	X	16	0.5		SP		SAND uniform fine, compact, 10% calcareous, poor cement, light red, dry, no odor			3.8		
	60	X	17	1.5		SP		SAND similar to above except 20% calcareous, moderate cement, <5% calcareous subrounded fine gravel, no odor					
	70	X	18	1.5		SP		SAND uniform very fine, loose, dry, red, no odor					
	80	X	19	1.5		SP		SAND similar to above, no odor					
	90							▼ Top of Saturation 91.2 feet					
		X	20	1.5		SP		SAND similar to above except very strong odor, saturated					
	100							Boring Terminated at 93.5 feet					

(1) SHELBY TUBE,SPLIT SPOON,ROCK CORE,or GRAB
(2) LENGTH OF SAMPLE RECOVERED
(3) STD. PENETRATION RESISTANCE BLOWS/FT
(4) UNIFIED SOIL CLASSIFICATION SYSTEM

LOG OF BORING

BORING NO.: B-E-3

LIENT: FINA OIL AND CHEMICAL COMPANY JOB NO. 119505 SHEET 1 of 1

ITE: Site E/ Big Spring, Texas DATE: START 9-7-88 FINISH 9-7-88

E GIST: Robert L. Sherrill DRILLER: Dusty Choate DRILL RIG TYPE: Failing 1250

EASURED GROUNDWATER LEVEL: DEPTH_____ DATE_____ TIME_____ REF._____

RILLING METHODS: Air Rotary Ground Level Elevation (MSL) = 2481.71 feet

OMMENTS: Base of Visible Contamination 10.4 feet/ Base of Odor 58.0 feet/ Base of Temporary Casing 16.0 feet

ELEVATION (FT.MSL)	DEPTH (FT.)	SAMPLE TYPE (1)	SAMPLE NO.	RECOVERY (2)	SPT N VALUE (3)	SYMBOL (4)	STRATIGRAPHY	SAMPLE DESCRIPTION	POCKET PENETROMETER TON/FT.^{2}	% PASSING NO. 200 SIEVE	MOISTURE CONTENT: NATURAL	MOISTURE CONTENT: LIQ. LIMIT	MOISTURE CONTENT: PLAS. INDEX
	0												
			21	1.5		SP		SAND uniform fine, loose, black, strong odor, damp					
	10		22	1.5		SP		SAND uniform fine, loose, dark red with black spots, strong odor, dry			3.6		
	20		23	1.5		SP		SAND uniform fine, loose, red, moderate odor, dry					
	30		24	1.5		SP		SAND similar to above except 10% calcareous, poor cement, slight odor, dry					
	40		25	1.5		SP		SAND similar to above, slight odor					
	50		26	1.5		SP		SAND similar to above, slight odor			5.7		
	60		27	1.5		SP		SAND similar to above except no odor			1.0		
	70		28	1.5		SP		SAND similar to above, no odor, 5% calcareous, poor cement			4.9		
	80		29	1.5		SP		SAND similar to above, no odor			6.8		
								▼ Top of Saturation 87.3 feet					
	90		30	1.5		SP		SAND similar to above except strong odor, saturated					
								Boring Terminated at 91.5 feet					
	100												

(1) SHELBY TUBE,SPLIT SPOON,ROCK CORE,or GRAB
(2) LENGTH OF SAMPLE RECOVERED
(3) STD. PENETRATION RESISTANCE BLOWS/FT
(4) UNIFIED SOIL CLASSIFICATION SYSTEM

JONES AND NEUSE, INC.
Engineering and Environmental Consultants

LOG OF BORING

BORING NO.: B-E-4

CLIENT: FINA OIL AND CHEMICAL COMPANY JOB NO. 119505 SHEET 1 of 1

SITE: Site E/Big Spring, Texas DATE: START 9-8-88 FINISH 9-8-88

GEOLOGIST: Robert L. Sherrill DRILLER: Dusty Choate DRILL RIG TYPE: Failing 1250

MEASURED GROUNDWATER LEVEL: DEPTH____ DATE____ TIME____ REF.____

DRILLING METHODS: Air Rotary Ground Level Elevation (MSL) = 2482.99 fee

COMMENTS: Base of Visible Contamination 5.5 feet/ Base of Odor 8.7 feet/ Base of Temporary Casing 10.5 fee

ELEVATION (FT.MSL)	DEPTH (FT.)	SAMPLE TYPE (1)	SAMPLE NO.	RECOVERY (2)	SPT N VALUE (3)	SYMBOL (4)	STRATIGRAPHY	SAMPLE DESCRIPTION	POCKET PENETROMETER TON/FT.2	% PASSING NO. 200 SIEVE	MOISTURE CONTENT NATURAL	MOISTURE CONTENT LIQ. LIMIT	MOISTURE CONTENT PLAS. INDEX
	0					SP		SAND uniform very fine, loose, black, moist, strong odor			11.3		
			31	1.5		SP		SAND similar to above except damp, moderate odor					
	10												
			32	1.5		SP		SAND uniform fine, loose, red, dry, no odor			2.5		
	20												
			33	1.5		SP		SAND similar to above,no odor			2.5		
	30												
			34	1.5		SP		SAND similar to above, no odor					
						SP		SAND similar to above except dense, 40% calcareous cement, well cemented, no odor, white			4.4		
	40					SP		SAND uniform fine, loose, red, dry, no odor					
			35	1.5		SP		SAND uniform very fine, dense,white, 40% calcareous cement, well cemented, dry, no odor			2.2		
	50												
			36	1.5		SP		SAND uniform fine, loose, red, dry, <5% fine subrounded gravel, no odor					
						SS		SANDSTONE very dense, fine grain, calcareous cement 60%					
	60												
			37	1.5		SP		SAND uniform fine, loose, red, dry, no odor					
	70												
			38	1.5		SP		SAND similar to above except damp, no odor					
	80							▼ Top of Saturation at 79.5 feet					
			39	1.5		SP		SAND similar to above except saturate, strong odor					
	90							Boring Terminated at 86.5 feet					
	100												

(1) SHELBY TUBE,SPLIT SPOON,ROCK CORE,or GRAB
(2) LENGTH OF SAMPLE RECOVERED
(3) STD. PENETRATION RESISTANCE BLOWS/FT
(4) UNIFIED SOIL CLASSIFICATION SYSTEM

LOG OF BORING

BORING NO.: B-BGE-5

CLIENT: FINA OIL AND CHEMICAL COMPANY JOB NO. 119505 SHEET 1 of 2

SITE: Site E/Big Spring, Texas DATE: START 9-9-88 FINISH 9-9-88

GEOLOGIST: Robert L. Sherrill DRILLER: Dusty Choate DRILL RIG TYPE: Failing 1250

MEASURED GROUNDWATER LEVEL: DEPTH____ DATE____ TIME____ REF.____

DRILLING METHODS: Air Rotary Ground Level Elevation (MSL) = 2504.43 feet

COMMENTS:____

ELEVATION (FT.MSL)	DEPTH (FT.)	SAMPLE TYPE (1)	SAMPLE NO.	RECOVERY (2)	SPT N VALUE (3)	SYMBOL (4)	STRATIGRAPHY	SAMPLE DESCRIPTION	POCKET PENETROMETER TON/FT.2	% PASSING NO. 200 SIEVE	MOISTURE CONTENT: NATURAL	MOISTURE CONTENT: LIQ. LIMIT	MOISTURE CONTENT: PLAS. INDEX
	0												
	10		40	1.5		SP		SAND uniform fine sand, loose, red, 5% calcareous content, dry, no odor			3.2		
	20		41	1.5		SP		SAND uniform medium sand, loose, red, dry, no odor			1.3		
	30		42	1.5		SP		SAND uniform fine sand, compact, 20% calcareous, poor cementation, white and red, dry, no odor			3.5		
	40		43	1.5		SP		SAND uniform fine sand, loose, red, dry, no odor					
	50		44	1.5		SP		SAND similar to above, no odor					
	60		45	1.5		SP		SAND similar to above, no odor			12.9		
	70		46	1.5		SP		SAND similar to above, no odor					
	80		47	1.5		SP		SAND uniform fine sand, compact, 10% calcareous, poor cementation, light red, dry, no odor			10.8		
	90		48	1.5		SP		SAND uniform fine sand, loose, <5% calcareous content as a fine subrounded gravel, red, dry, no odor					
	100												

(1) SHELBY TUBE,SPLIT SPOON,ROCK CORE,or GRAB
(2) LENGTH OF SAMPLE RECOVERED
(3) STD. PENETRATION RESISTANCE BLOWS/FT
(4) UNIFIED SOIL CLASSIFICATION SYSTEM

LOG OF BORING

BORING NO.: B-BGE-5

CLIENT: FINA OIL AND CHEMICAL COMPANY JOB NO. 119505 SHEET 2 of 2

SITE: Site E/Big Spring, Texas DATE: START 9-9-88 FINISH 9-9-88

GEOLOGIST: Robert L. Sherrill DRILLER: Dusty Choate DRILL RIG TYPE: Failing 1250

MEASURED GROUNDWATER LEVEL: DEPTH _____ DATE _____ TIME _____ REF. _____

DRILLING METHODS: Air Rotary

COMMENTS: _____

ELEVATION (FT.MSL)	DEPTH (FT.)	SAMPLE TYPE (1)	SAMPLE NO.	RECOVERY (2)	SPT N VALUE (3)	SYMBOL (4)	STRATIGRAPHY	SAMPLE DESCRIPTION	POCKET PENETROMETER TON/FT.^{2}	% PASSING NO. 200 SIEVE	MOISTURE CONTENT: NATURAL	MOISTURE CONTENT: LIQ. LIMIT	MOISTURE CONTENT: PLAS. INDEX
	100	X	49	1.5		SP		SAND uniform fine sand,loose, red,dry, no odor ▼ Top of Saturation at 102.6 feet			8.0		
	110	X	50	1.5		SP		SAND similar to above except saturated, strong odor					
								Boring Terminated at 111.5 feet below grade					
	120												
	130												
	140												
	150												
	160												
	170												
	180												
	190												
	200												

(1) SHELBY TUBE,SPLIT SPOON,ROCK CORE,or GRAB
(2) LENGTH OF SAMPLE RECOVERED
(3) STD. PENETRATION RESISTANCE BLOWS/FT
(4) UNIFIED SOIL CLASSIFICATION SYSTEM

LOG OF BORING

BORING NO.: B-BGE-6

CLIENT: FINA OIL AND CHEMICAL COMPANY JOB NO. 119505 SHEET 1 of 2

SITE: Site E/Big Spring, Texas DATE: START 9-9-88 FINISH 9-9-88

GEOLOGIST: Robert L. Sherrill DRILLER: Dusty Choate DRILL RIG TYPE: Failing 1250

MEASURED GROUNDWATER LEVEL: DEPTH_____ DATE_____ TIME_____ REF._____

DRILLING METHODS: Air Rotary Grount Level Elevation (MSL) = 2505.41 feet

COMMENTS:_____

ELEVATION (FT.MSL)	DEPTH (FT.)	SAMPLE TYPE (1)	SAMPLE NO.	RECOVERY (2)	SPT N VALUE (3)	SYMBOL (4)	STRATIGRAPHY	SAMPLE DESCRIPTION	POCKET PENETROMETER TON/FT.2	% PASSING NO. 200 SIEVE	MOISTURE CONTENT: NATURAL	MOISTURE CONTENT: LIQ. LIMIT	MOISTURE CONTENT: PLAS. INDEX
	0												
		⊠	51	1.5		SP		SAND uniform fine sand, loose, red, dry, no odor			2.0		
	10												
		⊠	52	1.5		SP		SAND similar to above, no odor			3.1		
	20												
		⊠	53	1.5		SP		SAND similar to above, no odor					
	30												
		⊠	54	1.5		SP		SAND similar to above, no odor			3.6		
	40												
		⊠	55	1.5		SP		SAND samilar to above, except 5% calcareous, poorly cemented, no odor, light red					
	50												
		⊠	56	1.5		SP		SAND uniform fine sand, dense, 40% calcareous, moderately cemented, dry, no odor, white			2.5		
	60												
		⊠	57	1.5		SP		SAND uniform fine sand, loose, 10% calcareous, poorly cemented, dry, light red, no odor					
	70												
		⊠	58	1.5		SP		SAND similar to above, no odor			3.2		
	80												
		⊠	59	1.5		SP		SAND similar to above, except <5% calcareous, no odor					
	90												
		⊠	60	1.5		SP		SAND uniform fine sand, loose, red, dry, no odor			2.2		
	100												

(1) SHELBY TUBE,SPLIT SPOON,ROCK CORE,or GRAB
(2) LENGTH OF SAMPLE RECOVERED
(3) STD. PENETRATION RESISTANCE BLOWS/FT
(4) UNIFIED SOIL CLASSIFICATION SYSTEM

LOG OF BORING

BORING NO.: B-BGE-6

CLIENT: FINA OIL AND CHEMICAL COMPANY JOB NO. 119505 SHEET 2 of 2

SITE: Site E/Big Spring, Texas DATE: START 9-9-88 FINISH 9-9-88

GEOLOGIST: Robert L. Sherrill DRILLER: Dusty Choate DRILL RIG TYPE: Failing 1250

MEASURED GROUNDWATER LEVEL: DEPTH_____ DATE_____ TIME_____ REF._____

DRILLING METHODS: Air Rotary

COMMENTS:_____

ELEVATION (FT.MSL)	DEPTH (FT.)	SAMPLE TYPE (1)	SAMPLE NO.	RECOVERY (2)	SPT N VALUE (3)	SYMBOL (4)	STRATIGRAPHY	SAMPLE DESCRIPTION	POCKET PENETROMETER TON/FT.2	% PASSING NO. 200 SIEVE	MOISTURE CONTENT: NATURAL	MOISTURE CONTENT: LIQ. LIMIT	MOISTURE CONTENT: PLAS. INDEX
	100							Top of Saturation 102.9 feet					
		⊠	61	1.5		SP		SAND similar to above except Saturation, strong odor					
								Boring Terminated at 106.5 feet below grade					
	110												
	120												
	130												
	140												
	150												
	160												
	170												
	180												
	190												
	200												

(1) SHELBY TUBE,SPLIT SPOON,ROCK CORE,or GRAB
(2) LENGTH OF SAMPLE RECOVERED
(3) STD. PENETRATION RESISTANCE BLOWS/FT
(4) UNIFIED SOIL CLASSIFICATION SYSTEM

LOG OF BORING

BORING NO.: B-BGE-7

CLIENT: FINA OIL AND CHEMICAL COMPANY JOB NO. 119505 SHEET 1 of 2

SITE: Site E/Big Spring, Texas DATE: START 9-10-88 FINISH 9-10-88

GEOLOGIST: Robert L. Sherrill DRILLER: Dusty Choate DRILL RIG TYPE: Failing 1250

MEASURED GROUNDWATER LEVEL: DEPTH DATE TIME REF.

DRILLING METHODS: Air Rotary Ground level Elevation (MSL) = 2502.30 feet

COMMENTS:

ELEVATION (FT.MSL)	DEPTH (FT.)	SAMPLE TYPE (1)	SAMPLE NO.	RECOVERY (2)	SPT N VALUE (3)	SYMBOL (4)	STRATIGRAPHY	SAMPLE DESCRIPTION	POCKET PENETROMETER TON/FT.^{2}	% PASSING NO. 200 SIEVE	MOISTURE CONTENT: NATURAL	MOISTURE CONTENT: LIQ. LIMIT	MOISTURE CONTENT: PLAS. INDEX
	0												
	10		62	1.5		SP		SAND uniform fine sand, loose, red, dry, no odor			6.9		
	20		63	1.5		SP		SAND similar to above, no odor			1.9		
	30		64	1.5		SP		SAND similar to above except <5% calcareous content, no odor					
	40		65	1.5		SP		SAND similar to above, no odor			7.5		
	50		66	1.5		SP		SAND similar to above, no odor					
	60		67	1.5		SP		SAND uniform fine sand, compact, 20% calcareous poor cement, dry, light red, no odor			3.7		
	70		68	1.5		SP		SAND uniform fine sand, loose, red, dry, no odor					
	80		69	1.5		SP		SAND similar to above, no odor			3.2		
	90		70	1.5		SP		SAND similar to above, no odor					
	100							▼ Top of Saturation 100.5 feet					

(1) SHELBY TUBE,SPLIT SPOON,ROCK CORE,or GRAB
(2) LENGTH OF SAMPLE RECOVERED
(3) STD. PENETRATION RESISTANCE BLOWS/FT
(4) UNIFIED SOIL CLASSIFICATION SYSTEM

LOG OF BORING

BORING NO.: 1B-BGE-7

CLIENT: FINA OIL AND CHEMICAL COMPANY JOB NO. 119505 SHEET 2 of 2

SITE: Site E/Big Spring, Texas DATE: START 9-10-88 FINISH 9-10-88

GEOLOGIST: Robert L. Sherrill DRILLER: Dusty Choate DRILL RIG TYPE: Failing 1250

MEASURED GROUNDWATER LEVEL: DEPTH _____ DATE _____ TIME _____ REF. _____

DRILLING METHODS: Air Rotary

COMMENTS: _____

ELEVATION (FT.MSL)	DEPTH (FT.)	SAMPLE TYPE (1)	SAMPLE NO.	RECOVERY (2)	SPT N VALUE (3)	SYMBOL (4)	STRATIGRAPHY	SAMPLE DESCRIPTION	POCKET PENETROMETER TON/FT.2	% PASSING NO. 200 SIEVE	MOISTURE CONTENT: NATURAL	MOISTURE CONTENT: LIQ. LIMIT	MOISTURE CONTENT: PLAS. INDEX
	100	X	71	1.5		SP		SAND similar to above except saturated, strong odor			22		
								Boring Terminated at 101.5 feet					
	110												
	120												
	130												
	140												
	150												
	160												
	170												
	180												
	190												
	200												

(1) SHELBY TUBE,SPLIT SPOON,ROCK CORE,or GRAB
(2) LENGTH OF SAMPLE RECOVERED
(3) STD. PENETRATION RESISTANCE BLOWS/FT
(4) UNIFIED SOIL CLASSIFICATION SYSTEM

LOG OF BORING

BORING NO.: B-BGE-8

CLIENT: FINA OIL AND CHEMICAL COMPANY JOB NO. 119505 SHEET 1 of 2

SITE: Site E/Big Spring, Texas DATE: START 9-10-88 FINISH 9-10-88

GEOLOGIST: Robert L. Sherrill DRILLER: Dusty Choate DRILL RIG TYPE: Failing 1250

MEASURED GROUNDWATER LEVEL: DEPTH____ DATE____ TIME____ REF.____

DRILLING METHODS: Air Rotary Ground level Elevation (MSL) = 2505.27 feet

COMMENTS:____

ELEVATION (FT.MSL)	DEPTH (FT.)	SAMPLE TYPE (1)	SAMPLE NO.	RECOVERY (2)	SPT N VALUE (3)	SYMBOL (4)	STRATIGRAPHY	SAMPLE DESCRIPTION	POCKET PENETROMETER TON/FT.^{2}	% PASSING NO. 200 SIEVE	MOISTURE CONTENT NATURAL	LIQ. LIMIT	PLAS. INDEX
	0												
		⊠	72	1.5		SP		SAND uniform fine, loose, red, dry, no odor			6.9		
	10												
		⊠	73	1.5		SP		SAND similar to above, no odor			2.1		
	20												
		⊠	74	1.5		SP		SAND similar to above, no odor					
	30												
		⊠	75	1.5		SP		SAND similar to above, no odor			3.6		
	40												
		⊠	76	1.5		SP		SAND similar to above, no odor					
	50												
		⊠	77	1.5		SP		SAND uniform fine sand, compact, 40% calcareous moderate cementation, white, dry, no odor			14.0		
	60												
		⊠	78	1.5		SP		SAND uniform fine sand, loose, red, dry, no odor					
	70												
		⊠	79	1.5		SP		SAND similar to above.except moist, no odor			13.5		
	80												
		⊠	80	1.5		SP		SAND similar to above, no odor					
	90												
		⊠	81	1.5		SP		SAND similar to above, no odor			2.1		
	100												

(1) SHELBY TUBE,SPLIT SPOON,ROCK CORE,or GRAB
(2) LENGTH OF SAMPLE RECOVERED
(3) STD. PENETRATION RESISTANCE BLOWS/FT
(4) UNIFIED SOIL CLASSIFICATION SYSTEM

LOG OF BORING

BORING NO.: B-BGE-8

CLIENT: FINA OIL AND CHEMICAL COMPANY JOB NO. 119505 SHEET 2 of 2

SITE: Site E/Big Spring, Texas DATE: START 9-10-88 FINISH 9-10-88

GEOLOGIST: Robert L. Sherrill DRILLER: Dusty Choate DRILL RIG TYPE: Failing 1250

MEASURED GROUNDWATER LEVEL: DEPTH DATE TIME REF.

DRILLING METHODS: Air Rotary

COMMENTS:

ELEVATION (FT.MSL)	DEPTH (FT.)	SAMPLE TYPE (1)	SAMPLE NO.	RECOVERY (2)	SPT N VALUE (3)	SYMBOL (4)	STRATIGRAPHY	SAMPLE DESCRIPTION	POCKET PENETROMETER TON/FT.2	% PASSING NO. 200 SIEVE	MOISTURE CONTENT: NATURAL	MOISTURE CONTENT: LIQ. LIMIT	MOISTURE CONTENT: PLAS. INDEX
	100							▼ Top of Saturation at 101.1 feet					
			82	1.5		SP		SAND similar to above except sdaturation, strong odor					
								Boring Terminated at 106.5 feet					
	110												
	120												
	130												
	140												
	150												
	160												
	170												
	180												
	190												
	200												

(1) SHELBY TUBE,SPLIT SPOON,ROCK CORE,or GRAB
(2) LENGTH OF SAMPLE RECOVERED
(3) STD. PENETRATION RESISTANCE BLOWS/FT
(4) UNIFIED SOIL CLASSIFICATION SYSTEM

LOG OF BORING

BORING NO. B-1

CLIENT: Fina Oil and Chemical Company JOB NO. 1-195-05 SHEET 1 of 2

SITE: Big Spring, Texas DATE: START 08-18-89 FINISH 08-18-89

GEOLOGIST: Robert L. Sherrill DRILLER: Choate Well Service DRILL RIG TYPE: Failing 1000

MEASURED GROUNDWATER LEVEL: DEPTH Not measured DATE — TIME — REF. —

DRILLING METHODS: Air Rotary

COMMENTS Top of saturation at 98.0 feet below grade.

ELEVATION (FT.MSL)	DEPTH (FT.)	SAMPLE TYPE (1)	SAMPLE NO.	RECOVERY (2)	HNu READING	SYMBOL (4)	STRATIGRAPHY	SAMPLE DESCRIPTION	DISCOLORATION	ODOR	% PASSING NO. 200 SIEVE	MOISTURE CONTENT: NATURAL	MOISTURE CONTENT: LIQ. LIMIT	MOISTURE CONTENT: PLAS. INDEX
2496	0					SP		Sand - uniform, fine, compact, black, damp						
	10													
2480		X	1	1.5	5.0	SP		Sand - uniform, very fine to fine, loose, red, dry						
	20													
2470		X	2	1.5	0.1	SP		Sand - fine grain, 30% calcareous cement (very weak), pink, compact, dry						
	30													
2460		X	3	1.5	0	SP		Sand - uniform, fine, loose, red, dry						
	40													
2450		X	4	1.5	0.2	SP		Sand - similar to above						
	50													
2440		X	5	1.5	0.1	SS		Sandstone - dense, well cemented, 40% calcareous cement, white, and pink, dry						
	60													
2430		X	6	1.5	0	SS		Sandstone - moderately dense, white and pink, 25% calcareous cement, dry						
	70													
2420		X	7	1.5	0	SS		Sandstone - similar to above						
	80													
2410		X	8	1.5	0	SP		Sand - uniform, fine, compact, pink, dry						
	90													
2400		X	9	1.5	0.2	SP		Sand - uniform, fine, loose, red, damp ▼						
	100													

(1) SHELBY TUBE, SPLIT SPOON, ROCK CORE OR GRAB
(2) LENGTH OF SAMPLE RECOVERED
(3) STD. PENETRATION RESISTANCE BLOWS/FT.
(4) UNIFIED SOIL CLASSIFICATION SYSTEM

LOG OF BORING

BORING NO. E-1

CLIENT: Fina Oil and Chemical Company JOB NO. 119505 SHEET 2 of 2

SITE: Big Spring, Texas DATE: START 08-18-89 FINISH 08-18-89

GEOLOGIST: Robert Sherrill DRILLER: Choate Well Service DRILL RIG TYPE: Failing 1000

MEASURED GROUNDWATER LEVEL: DEPTH Not measured DATE — TIME — REF. —

DRILLING METHODS: Air Rotary

COMMENTS Top of saturation at 98.0 feet below grade

ELEVATION (FT.MSL)	DEPTH (FT.)	SAMPLE TYPE (1)	SAMPLE NO.	RECOVERY (2)	HNu READING	SYMBOL (4)	STRATIGRAPHY	SAMPLE DESCRIPTION	DISCOLORATION	ODOR	% PASSING NO. 200 SIEVE	MOISTURE CONTENT: NATURAL	MOISTURE CONTENT: LIQ. LIMIT	MOISTURE CONTENT: PLAS. INDEX
	100													
2390		X	10	1.5	0.5	SP		Sand - similar to above, except saturated.						
	110							BORING TERMINATED 107.5 FEET BELOW GROUND SURFACE						

(1) SHELBY TUBE, SPLIT SPOON, ROCK CORE OR GRAB
(2) LENGTH OF SAMPLE RECOVERED
(3) STD. PENETRATION RESISTANCE BLOWS/FT.
(4) UNIFIED SOIL CLASSIFICATION SYSTEM

LOG OF BORING

BORING NO. B-2

CLIENT: Fina Oil and Chemical Company JOB NO. 119505 SHEET 1 of 2

SITE: Big Spring, Texas DATE: START 08-17-89 FINISH 08-17-89

GEOLOGIST: Robert Sherrill DRILLER: Choate Well Service DRILL RIG TYPE: Failing 1000

MEASURED GROUNDWATER LEVEL: DEPTH Not measured DATE — TIME — REF. —

DRILLING METHODS: Air Rotary Ground level elevation (msl) = 2494.9

COMMENTS Top of saturation 98.9 feet below grade

ELEVATION (FT.MSL)	DEPTH (FT.)	SAMPLE TYPE (1)	SAMPLE NO.	RECOVERY (2)	HNu READING	SYMBOL (4)	STRATIGRAPHY	SAMPLE DESCRIPTION	DISCOLORATION	ODOR	% PASSING NO. 200 SIEVE	MOISTURE CONTENT: NATURAL	MOISTURE CONTENT: LIQ. LIMIT	MOISTURE CONTENT: PLAS. INDEX
2490	0	X	1	1.5	48	SP		Sand - uniform, fine, loose, black, moist						
2480	10	X	2	1.5	52	SP		Sand - similar to above, except compact						
2470	20	X	3	1.5	29	SP		Sand - uniform, fine, loose, tan and black, dry						
2460	30	X	4	1.5	26	SP		Sand - uniform, fine, loose, red, dry						
2450	40	X	5	1.5	48	SP		Sand - similar to above						
2440	50	X	6	1.5	33	SP		Sand - similar to above, except compact						
2430	60	X	7	1.5	50	SP		Sand - similar to above						
2420	70	X	8	1.5	40	SP		Sand - similar to above, except with 10% weak calcareous cement						
2410	80	X	9	1.5	28	SP		Sand - similar to above, except with 10% weak calcareous cement						
2400	90	X	10	1.5	0.6	SP		Sand - similar to above						
	100													

(1) SHELBY TUBE, SPLIT SPOON, ROCK CORE OR GRAB
(2) LENGTH OF SAMPLE RECOVERED
(3) STD. PENETRATION RESISTANCE BLOWS/FT.
(4) UNIFIED SOIL CLASSIFICATION SYSTEM

LOG OF BORING

BORING NO. E-2

CLIENT: Fina Oil and Chemical Company JOB NO. 119505 SHEET 2 of 2

SITE: Big Spring, Texas DATE: START 08-17-89 FINISH 08-17-89

GEOLOGIST: Robert Sherrill DRILLER: Choate Well Service DRILL RIG TYPE: Failing 1000

MEASURED GROUNDWATER LEVEL: DEPTH Not measured DATE — TIME — REF. —

DRILLING METHODS: Air Rotary

COMMENTS

ELEVATION (FT.MSL)	DEPTH (FT.)	SAMPLE TYPE (1)	SAMPLE NO.	RECOVERY (2)	HNu READING	SYMBOL (4)	STRATIGRAPHY	SAMPLE DESCRIPTION	DISCOLORATION	ODOR	% PASSING NO. 200 SIEVE	MOISTURE CONTENT: NATURAL	MOISTURE CONTENT: LIQ. LIMIT	MOISTURE CONTENT: PLAS. INDEX
	100													
2390		X	11	1.5	80	SP		Sand - similar to above, except saturation						
	110							BORING TERMINATED 106.4 FEET BELOW GROUND SURFACE						

(1) SHELBY TUBE, SPLIT SPOON, ROCK CORE OR GRAB
(2) LENGTH OF SAMPLE RECOVERED
(3) STD. PENETRATION RESISTANCE BLOWS/FT.
(4) UNIFIED SOIL CLASSIFICATION SYSTEM

LOG OF BORING

BORING NO. B-2A

CLIENT: Fina Oil and Chemical Company JOB NO. 119505 SHEET 1 of 1

SITE: Big Spring, Texas DATE: START 11-10-89 FINISH 11-10-89

GEOLOGIST: Robert Sherrill DRILLER: Choate Well Service DRILL RIG TYPE: Failing 1000

MEASURED GROUNDWATER LEVEL: DEPTH ____ DATE ____ TIME ____ REF. ____

DRILLING METHODS: Air Rotary Drilling Ground level elevation (msl) = 2494.3

COMMENTS Top of saturation at 96.0 feet below grade

ELEVATION (FT.MSL)	DEPTH (FT.)	SAMPLE TYPE (1)	SAMPLE NO.	RECOVERY (2)	HNu READING	SYMBOL (4)	STRATIGRAPHY	SAMPLE DESCRIPTION	DISCOLORATION	ODOR	% PASSING NO. 200 SIEVE	MOISTURE CONTENT: NATURAL	MOISTURE CONTENT: LIQ. LIMIT	MOISTURE CONTENT: PLAS. INDEX
2494.3	0													
2490			1	1.5		SP		Sand - uniform fine grain sand, compact, black, moist with oil, strong odor						
	10													
2480			2	1.5										
	20													
2470			3	1.5		SP		Sand - similar to above						
	30													
2460			4	1.5		SP		Sand - similar to above						
	40													
2450			5	1.5										
	50					SP		Sand - similar to above						
2440			6	1.5										
	60													
2430			7	1.5	2.8	SP		Sand - uniform fine sand with minor calcareous nodules, loose, red, slight odor						
	70													
2420			8	1.5	1.3	SP		Sand - similar to above except with 5% weak calcareous cement, red and white, very slight odor						
	80													
2410			9	1.5	1.6	SP		Sand - similar to above						
	90													
2400			10	1.5	1.4	SP		Sand - similar to above except damp ▼						
	100							Boring Terminated 97.0 feet below grade						

(1) SHELBY TUBE, SPLIT SPOON, ROCK CORE OR GRAB
(2) LENGTH OF SAMPLE RECOVERED
(3) STD. PENETRATION RESISTANCE BLOWS/FT.
(4) UNIFIED SOIL CLASSIFICATION SYSTEM

LOG OF BORING

BORING NO. E-2B

CLIENT: Fina Oil and Chemical Company JOB NO. 119505 SHEET 1 of 1

SITE: Big Spring, Texas DATE: START 11-10-89 FINISH 11-10-89

GEOLOGIST: Robert Sherrill DRILLER: Choate Well Service DRILL RIG TYPE: Failing 1000

MEASURED GROUNDWATER LEVEL: DEPTH _____ DATE _____ TIME _____ REF. _____

DRILLING METHODS: Air Rotary Drilling Ground level elevation (msl) = 2494.9

COMMENTS Top of saturation at 95.4 feet below grade

ELEVATION (FT.MSL)	DEPTH (FT.)	SAMPLE TYPE (1)	SAMPLE NO.	RECOVERY (2)	HNu READING	SYMBOL (4)	STRATIGRAPHY	SAMPLE DESCRIPTION	DISCOLORATION	ODOR	% PASSING NO. 200 SIEVE	MOISTURE CONTENT: NATURAL	MOISTURE CONTENT: LIQ. LIMIT	MOISTURE CONTENT: PLAS. INDEX
2494.9	0													
2490			1	1.5		SP		Sand – uniform fine grain sand, compact, black, moist with oil, strong odor						
	10													
2480			2	1.5										
	20					SP		Sand – similar to above						
2470			3	1.5										
	30													
2460			4	1.5	41	SP		Sand – uniform fine sand, compact to loose, red with black spots, dry, strong odor						
	40													
2450			5	1.5	40	SP		Sand – similar to above except no discoloration						
	50													
2440			6	1.5	38	SP		Sand – similar to above except with 5% calcareous cement						
	60													
2430			7	1.5	1.6	SP		Sand – similar to above except slight odor						
	70													
2420			8	1.5	3.8	SP		Sand – similar to above						
	80													
2410			9	1.5	1.8	SP		Sand – similar to above except very slight odor						
	90													
2400			10	1.5	2.0	SP		Sand – similar to above except moist, slight odor ▼						
	100							Boring Terminated 96.4 feet below grade						

(1) SHELBY TUBE, SPLIT SPOON, ROCK CORE OR GRAB
(2) LENGTH OF SAMPLE RECOVERED
(3) STD. PENETRATION RESISTANCE BLOWS/FT.
(4) UNIFIED SOIL CLASSIFICATION SYSTEM

JONES AND NEUSE, INC.
Engineering and Environmental Consultants
Austin, Houston, Belton, Temple, Corpus Christi, Orange

LOG OF BORING

BORING NO. B-3

CLIENT: Fina Oil and Chemical Company JOB NO. 119505 SHEET 1 of 2

SITE: Big Spring, Texas DATE: START 08-17-89 FINISH 08-17-89

GEOLOGIST: Robert Sherrill DRILLER: Choate Well Service DRILL RIG TYPE: Failing 1000

MEASURED GROUNDWATER LEVEL: DEPTH Not measured DATE — TIME — REF. —

DRILLING METHODS: Air Rotary Ground level elevation (msl) = 2496.2

COMMENTS Top of saturation 98 feet below grade

ELEVATION (FT.MSL)	DEPTH (FT.)	SAMPLE TYPE (1)	SAMPLE NO.	RECOVERY (2)	HNu READING	SYMBOL (4)	STRATIGRAPHY	SAMPLE DESCRIPTION	DISCOLORATION	ODOR	% PASSING NO. 200 SIEVE	MOISTURE CONTENT: NATURAL	MOISTURE CONTENT: LIQ. LIMIT	MOISTURE CONTENT: PLAS. INDEX
2496.2	0													
	10													
2480	20	X	1	1.5	21	SP		Sand – uniform, fine, loose, red, dry						
2470	30	X	2	1.5	1.6	SP		Sand – similar to above						
2460	40	X	3	1.5	1.3	SP		Sand – similar to above						
2450	50	X	4	1.5	0.2	SP		Sand – similar to above						
2440	60	X	5	1.5	0.8	SS		Sandstone – fine texture, 20% weak calcareous cement, compact, pink, dry						
2430	70	X	6	1.5	0.3	SS		Sandstone – similar to above except moderately dense						
2420	80	X	7	1.5	0.1	SP		Sand – uniform, fine, compact, red, dry						
2410	90	X	8	1.5	0	SP		Sand – uniform, fine, compact, red, dry						
2400		X	9	1.5	0	SP		Sand – similar to above, except damp ▼						

(1) SHELBY TUBE, SPLIT SPOON, ROCK CORE OR GRAB
(2) LENGTH OF SAMPLE RECOVERED
(3) STD. PENETRATION RESISTANCE BLOWS/FT.
(4) UNIFIED SOIL CLASSIFICATION SYSTEM

LOG OF BORING

BORING NO. B-3

CLIENT: Fina Oil and Chemical Company JOB NO. 119505 SHEET 2 of 2

SITE: Big Spring, Texas DATE: START 08-17-89 FINISH 08-17-89

GEOLOGIST: Robert Sherrill DRILLER: Choate Well Service DRILL RIG TYPE: Failing 1000

MEASURED GROUNDWATER LEVEL: DEPTH Not measured DATE — TIME — REF. —

DRILLING METHODS: Air Rotary

COMMENTS

ELEVATION (FT.MSL)	DEPTH (FT.)	SAMPLE TYPE (1)	SAMPLE NO.	RECOVERY (2)	HNu READING	SYMBOL (4)	STRATIGRAPHY	SAMPLE DESCRIPTION	DISCOLORATION	ODOR	% PASSING NO. 200 SIEVE	MOISTURE CONTENT: NATURAL	MOISTURE CONTENT: LIQ. LIMIT	MOISTURE CONTENT: PLAS. INDEX
	100													
2390		X	10	1.5	0.1	SP		Sand - similar to above						
	110							BORING TERMINATED AT 107.7 FEET BELOW GROUND SURFACE						

(1) SHELBY TUBE, SPLIT SPOON, ROCK CORE OR GRAB
(2) LENGTH OF SAMPLE RECOVERED
(3) STD. PENETRATION RESISTANCE BLOWS/FT.
(4) UNIFIED SOIL CLASSIFICATION SYSTEM

LOG OF BORING

BORING NO. B-4

CLIENT: Fina Oil and Chemical Company JOB NO. 1-195-05 SHEET 1 of 2

SITE: Big Spring, Texas DATE: START 08-18-89 FINISH 08-18-89

GEOLOGIST: Robert Sherrill DRILLER: Choate Well Service DRILL RIG TYPE: Failing 1000

MEASURED GROUNDWATER LEVEL: DEPTH Not measured DATE — TIME — REF. —

DRILLING METHODS: Air Rotary

COMMENTS Top of saturation at 98.7 feet below grade

ELEVATION (FT.MSL)	DEPTH (FT.)	SAMPLE TYPE (1)	SAMPLE NO.	RECOVERY (2)	HNu READING	SYMBOL (4)	STRATIGRAPHY	SAMPLE DESCRIPTION	DISCOLORATION	ODOR	% PASSING NO. 200 SIEVE	MOISTURE CONTENT: NATURAL	MOISTURE CONTENT: LIQ. LIMIT	MOISTURE CONTENT: PLAS. INDEX
2492.4	0													
2490		X	1	1.5	81.0	SP		Sand - uniform fine grain, compact, black, moist						
	10													
2480		X	2	1.5	12.0	SP		Sand - uniform fine grain, loose, black, damp						
	20													
2470		X	3	1.5	0.1	SP		Sand - uniform very fine, loose, red, dry						
	30													
2460		X	4	1.5	0	SP		Sand - similar to above						
	40													
2450		X	5	1.5	0	SP		Sand - similar to above						
	50													
2440		X	6	1.5	0	SP		Sand - similar to above						
	60													
2430		X	7	1.5	0	SP		Sand - similar to above except 10% very poor calcareous cement						
	70													
2420		X	8	1.5	0	SP		Sand - similar to above						
	80													
2410		X	9	1.5	0	SP		Sand - similar to above						
	90													
2400		X	10	1.5	0	SP		Sand - similar to above						
	100													

(1) SHELBY TUBE, SPLIT SPOON, ROCK CORE OR GRAB
(2) LENGTH OF SAMPLE RECOVERED
(3) STD. PENETRATION RESISTANCE BLOWS/FT.
(4) UNIFIED SOIL CLASSIFICATION SYSTEM

LOG OF BORING

BORING NO. E-4

CLIENT: Fina Oil and Chemical Company JOB NO. 1-195-05 SHEET 2 of 2

SITE: Big Spring, Texas DATE: START 08-18-89 FINISH 08-18-89

GEOLOGIST: Robert Sherrill DRILLER: Choate Well Service DRILL RIG TYPE: Failing 1000

MEASURED GROUNDWATER LEVEL: DEPTH Not measured DATE — TIME — REF. —

DRILLING METHODS: Air Rotary

COMMENTS Top of saturation at 98.0 feet below grade.

ELEVATION (FT.MSL)	DEPTH (FT.)	SAMPLE TYPE (1)	SAMPLE NO.	RECOVERY (2)	HNu READING	SYMBOL (4)	STRATIGRAPHY	SAMPLE DESCRIPTION	DISCOLORATION	ODOR	% PASSING NO. 200 SIEVE	MOISTURE CONTENT: NATURAL	MOISTURE CONTENT: LIQ. LIMIT	MOISTURE CONTENT: PLAS. INDEX
2390	100	X	11	1.5	2.1	SP		Sand - uniform fine, loose, gray, saturated		■				
								BORING TERMINATED AT 103.9 FEET BELOW GRADE						
	110													

(1) SHELBY TUBE, SPLIT SPOON, ROCK CORE OR GRAB
(2) LENGTH OF SAMPLE RECOVERED
(3) STD. PENETRATION RESISTANCE BLOWS/FT.
(4) UNIFIED SOIL CLASSIFICATION SYSTEM

LOG OF BORING

BORING NO. B-5

CLIENT: Fina Oil and Chemical Company JOB NO. 1-195-05 SHEET 1 of 2

SITE: Big Spring, Texas DATE: START 08-19-89 FINISH 08-19-89

GEOLOGIST: Robert Sherrill DRILLER: Choate Well Service DRILL RIG TYPE: Failing 1000

MEASURED GROUNDWATER LEVEL: DEPTH Not measured DATE — TIME — REF. —

DRILLING METHODS: Air Rotary

COMMENTS Top of saturation at 94.7 feet below grade.

ELEVATION (FT.MSL)	DEPTH (FT.)	SAMPLE TYPE (1)	SAMPLE NO.	RECOVERY (2)	HNu READING	SYMBOL (4)	STRATIGRAPHY	SAMPLE DESCRIPTION	DISCOLORATION	ODOR	% PASSING NO. 200 SIEVE	MOISTURE CONTENT: NATURAL	LIQ. LIMIT	PLAS. INDEX
2489.9	0													
2480	10	X	1	1.5	26	SP		Sand – uniform, fine, dense, black, saturated with oil						
2470	20	X	2	1.5	9	SP		Sand – uniform, fine, compact, black and red, damp						
2460	30	X	3	1.5	8.2	SP		Sand – uniform, fine, loose, red, dry						
2450	40	X	4	1.5	0	SP		Sand – similar to above						
2440	50	X	5	1.5	0	SS		Sandstone – moderately dense, 40% calcareous cement, pink, dry						
2430	60	X	6	1.5	0	SP		Sand – uniform, fine, compact, 15% very poor calcareous cement, pink, dry						
2420	70	X	7	1.5	0	SP		Sand – similar to above						
2410	80	X	8	1.5	0	SP		Sand – similar to above						
2400	90	X	9	1.5	0	SP		Sand – similar to above						
2390	100													

(1) SHELBY TUBE, SPLIT SPOON, ROCK CORE OR GRAB
(2) LENGTH OF SAMPLE RECOVERED
(3) STD. PENETRATION RESISTANCE BLOWS/FT.
(4) UNIFIED SOIL CLASSIFICATION SYSTEM

LOG OF BORING

BORING NO. B-5

CLIENT: Fina Oil and Chemical Company JOB NO. 1-195-05 SHEET 2 of 2

SITE: Big Spring, Texas DATE: START 08-19-89 FINISH 08-19-89

GEOLOGIST: Robert Sherrill DRILLER: Choate Well Service DRILL RIG TYPE: Failing 1000

MEASURED GROUNDWATER LEVEL: DEPTH Not measured DATE — TIME — REF. —

DRILLING METHODS: Air Rotary

COMMENTS Top of saturation at 94.7 feet below grade.

ELEVATION (FT.MSL)	DEPTH (FT.)	SAMPLE TYPE (1)	SAMPLE NO.	RECOVERY (2)	HNu READING	SYMBOL (4)	STRATIGRAPHY	SAMPLE DESCRIPTION	DISCOLORATION	ODOR	% PASSING NO. 200 SIEVE	MOISTURE CONTENT: NATURAL	MOISTURE CONTENT: LIQ. LIMIT	MOISTURE CONTENT: PLAS. INDEX
2390	100	X	10	1.5	1.0	SP		Sand – similar to above, except saturated		■				
								BORING TERMINATED AT 101.4 FEET BELOW GROUND SURFACE						
	110													

(1) SHELBY TUBE, SPLIT SPOON, ROCK CORE OR GRAB
(2) LENGTH OF SAMPLE RECOVERED
(3) STD. PENETRATION RESISTANCE BLOWS/FT.
(4) UNIFIED SOIL CLASSIFICATION SYSTEM

LOG OF BORING

BORING NO. E-6

CLIENT: Fina Oil and Chemical Company JOB NO. 1-195-05 SHEET 1 of 2

SITE: Big Spring, Texas DATE: START 08-19-89 FINISH 08-19-89

GEOLOGIST: Robert Sherrill DRILLER: Choate Well Service DRILL RIG TYPE: Failing 1000

MEASURED GROUNDWATER LEVEL: DEPTH Not measured DATE --- TIME --- REF. ---

DRILLING METHODS: Air Rotary

COMMENTS Top of saturation at 97.5 feet below grade.

ELEVATION (FT.MSL)	DEPTH (FT.)	SAMPLE TYPE (1)	SAMPLE NO.	RECOVERY (2)	HNu READING	SYMBOL (4)	STRATIGRAPHY	SAMPLE DESCRIPTION	DISCOLORATION	ODOR	% PASSING NO. 200 SIEVE	MOISTURE CONTENT: NATURAL	MOISTURE CONTENT: LIQ. LIMIT	MOISTURE CONTENT: PLAS. INDEX
2481.6	0													
2480	10	X	1	1.5	8	SP		Sand - uniform, fine, dense, black and red, moist						
2470	20	X	2	1.5	0	SP		Sand - uniform, very fine, loose, red, dry						
2460	30	X	3	1.5	0	SP		Sand - similar to above						
2450	40	X	4	1.5	0	SP		Sand - uniform, fine, with 10% poor calcareous cement, compact, red, dry						
2440	50	X	5	1.5	0	SP		Sand - similar to above						
2430	60	X	6	1.5	0	SP		Sand - similar to above						
2420	70	X	7	1.5	0	SP		Sand - similar to above						
2410	80	X	8	1.5	0	SP		Sand - similar to above						
2400	90	X	9	1.5	0	SP		Sand - similar to above						
	100													

(1) SHELBY TUBE, SPLIT SPOON, ROCK CORE OR GRAB
(2) LENGTH OF SAMPLE RECOVERED
(3) STD. PENETRATION RESISTANCE BLOWS/FT.
(4) UNIFIED SOIL CLASSIFICATION SYSTEM

LOG OF BORING

BORING NO. E-6

CLIENT: Fina Oil and Chemical Company JOB NO. 1-195-05 SHEET 2 of 2

SITE: Big Spring, Texas DATE: START 08-19-89 FINISH 08-19-89

GEOLOGIST: Robert Sherrill DRILLER: Choate Well Service DRILL RIG TYPE: Failing 1000

MEASURED GROUNDWATER LEVEL: DEPTH Not measured DATE — TIME — REF. —

DRILLING METHODS: Air Rotary

COMMENTS Top of saturation at 97.5 feet below grade.

ELEVATION (FT.MSL)	DEPTH (FT.)	SAMPLE TYPE (1)	SAMPLE NO.	RECOVERY (2)	HNu READING	SYMBOL (4)	STRATIGRAPHY	SAMPLE DESCRIPTION	DISCOLORATION	ODOR	% PASSING NO. 200 SIEVE	MOISTURE CONTENT: NATURAL	MOISTURE CONTENT: LIQ. LIMIT	MOISTURE CONTENT: PLAS. INDEX
2390	100	X	10	1.5	2.1	SP		Sand - uniform, fine, loose, gray		■				
								BORING TERMINATED AT 103.1 FEET BELOW GROUND SURFACE						
	110													

(1) SHELBY TUBE, SPLIT SPOON, ROCK CORE OR GRAB
(2) LENGTH OF SAMPLE RECOVERED
(3) STD. PENETRATION RESISTANCE BLOWS/FT.
(4) UNIFIED SOIL CLASSIFICATION SYSTEM

LOG OF BORING

BORING NO. B-7

CLIENT: Fina Oil and Chemical Company JOB NO. 1-195-05 SHEET 1 of 1

SITE: Big Spring, Texas DATE: START 08-19-89 FINISH 08-19-89

GEOLOGIST: Robert Sherrill DRILLER: Choate Well Service DRILL RIG TYPE: Failing 1000

MEASURED GROUNDWATER LEVEL: DEPTH Not measured DATE --- TIME --- REF. ---

DRILLING METHODS: Air Rotary

COMMENTS Top of saturation at 95.7 feet below grade.

ELEVATION (FT.MSL)	DEPTH (FT.)	SAMPLE TYPE (1)	SAMPLE NO.	RECOVERY (2)	HNu READING	SYMBOL (4)	STRATIGRAPHY	SAMPLE DESCRIPTION	DISCOLORATION	ODOR	% PASSING NO. 200 SIEVE	MOISTURE CONTENT: NATURAL	MOISTURE CONTENT: LIQ. LIMIT	MOISTURE CONTENT: PLAS. INDEX
2489.5	0					SP		Sand - uniform, fine, dense, black, moist						
2480	10	X	1	1.5	10	SP		Sand - uniform, fine, compact, red and black mix, damp						
2470	20	X	2	1.5	1.2	SP		Sand - uniform, very fine, loose, red, dry						
2460	30	X	3	1.5	0	SP		Sand - similar to above						
2450	40	X	4	1.5	0	SP		Sand - similar to above						
2440	50	X	5	1.5	0	SP		Sand - similar to above						
2430	60	X	6	1.5	0	SP		Sand - similar to above except 20% poorly developed calcareous cement, pink						
2420	70	X	7	1.5	0	SP		Sand - similar to above except no calcareous cement, red						
2410	80	X	8	1.5	0	SP		Sand - similar to above						
2400	90	X	9	1.5	0	SP		Sand - similar to above						
2390	100	X	10	1.5	4.5	SP		Sand - uniform, fine, loose, red, saturated						
								BORING TERMINATED AT 101 FEET BELOW GROUND SURFACE						

(1) SHELBY TUBE, SPLIT SPOON, ROCK CORE OR GRAB (2) LENGTH OF SAMPLE RECOVERED
(3) STD. PENETRATION RESISTANCE BLOWS/FT. (4) UNIFIED SOIL CLASSIFICATION SYSTEM

LOG OF BORING

BORING NO. E-8

CLIENT: Fina Oil and Chemical Company JOB NO. 1-195-05 SHEET 1 of 1

SITE: Big Spring, Texas DATE: START 08-20-89 FINISH 08-20-89

GEOLOGIST: Robert Sherrill DRILLER: Choate Well Service DRILL RIG TYPE: Failing 1000

MEASURED GROUNDWATER LEVEL: DEPTH Not measured DATE — TIME — REF. —

DRILLING METHODS: Air Rotary

COMMENTS Top of saturation at 88.2 feet below grade.

ELEVATION (FT.MSL)	DEPTH (FT.)	SAMPLE TYPE (1)	SAMPLE NO.	RECOVERY (2)	HNu READING	SYMBOL (4)	STRATIGRAPHY	SAMPLE DESCRIPTION	DISCOLORATION	ODOR	% PASSING NO. 200 SIEVE	MOISTURE CONTENT: NATURAL	MOISTURE CONTENT: LIQ. LIMIT	MOISTURE CONTENT: PLAS. INDEX
2486.6	0													
2480	10	X	1	1.5	118	SP		Sand - uniform, fine, dense, black, moist						
2470	20	X	2	1.5	0.4	SP		Sand - uniform, fine, compact, red with black streaks, dry						
2460	30	X	3	1.5	0	SP		Sand - uniform, very fine, loose, red, dry						
2450	40	X	4	1.5	0	SP		Sand - similar to above						
2440	50	X	5	1.5	0	SS		Sandstone - medium, dense, with 30% calcareous cement, fine grain texture, white and pink, dry						
2430	60	X	6	1.5	0	SS		Sandstone - similar to above						
2420	70	X	7	1.5	0	SS		Sandstone - similar to above						
2410	80	X	8	1.5	0	SP		Sand - uniform, fine, loose, red, dry						
2400	90	X	9	1.5	0.1	SP		Sand - similar to above except moist ▼						
2390	100	X	10	1.5	0.6	SP		Sand - similar to above, except saturated						
								BORING TERMINATED AT 98.1 FEET BELOW GROUND SURFACE						

(1) SHELBY TUBE, SPLIT SPOON, ROCK CORE OR GRAB
(2) LENGTH OF SAMPLE RECOVERED
(3) STD. PENETRATION RESISTANCE BLOWS/FT.
(4) UNIFIED SOIL CLASSIFICATION SYSTEM

LOG OF BORING

BORING NO. B-10

CLIENT: Fina Oil and Chemical Company JOB NO. 119505 SHEET 1 of 1

SITE: Big Spring, Texas DATE: START 11-9-89 FINISH 11-9-89

GEOLOGIST: Robert Sherrill DRILLER: Choate Well Service DRILL RIG TYPE: Failing 1000

MEASURED GROUNDWATER LEVEL: DEPTH _____ DATE _____ TIME _____ REF. _____

DRILLING METHODS: Air Rotary Drilling Ground level elevation (msl) = 2489.1

COMMENTS Top of saturation at 90.8 feet below grade

ELEVATION (FT.MSL)	DEPTH (FT.)	SAMPLE TYPE (1)	SAMPLE NO.	RECOVERY (2)	HNu READING	SYMBOL (4)	STRATIGRAPHY	SAMPLE DESCRIPTION	DISCOLORATION	ODOR	% PASSING NO. 200 SIEVE	MOISTURE CONTENT: NATURAL	MOISTURE CONTENT: LIQ. LIMIT	MOISTURE CONTENT: PLAS. INDEX
2489.1	0													
2480	10	X	1	1.5	0.0	SP		Sand - uniform fine sand, loose, red, dry, no odor						
2470	20	X	2	1.5	0.0	SP		Sand - similar to above						
2460	30	X	3	1.5	0.0	SP		Sand - similar to above						
2450	40	X	4	1.5	0.0	SP		Sand - similar to above						
						SS		Sandstone - dense, 40% moderate calcareous cement, unweathered, white, dry, no odor						
2440	50	X	5	1.5	0.0	SP		Sand - uniform fine sand, loose, red, dry, no odor						
2430	60	X	6	1.5	0.0			Sand - similar to above except with 5% calcareous nodules						
2420	70	X	7	1.5	0.0			Sand - similar to above except no calcareous nodules						
2410	80	X	8	1.5	0.0			Sand - similar to above						
2400	90	X	9	1.5	0.1			Sand - similar to above except damp, slight odor ▼						
2390	100	X	10	1.5	1.8			Sand - similar to above except saturated, strong odor						
								Boring Terminated at 100.6 feet below grade						

(1) SHELBY TUBE, SPLIT SPOON, ROCK CORE OR GRAB
(2) LENGTH OF SAMPLE RECOVERED
(3) STD. PENETRATION RESISTANCE BLOWS/FT.
(4) UNIFIED SOIL CLASSIFICATION SYSTEM

LOG OF BORING

BORING NO. E-11

CLIENT: Fina Oil and Chemical JOB NO. 119505 SHEET 1 of 1

SITE: Big Spring, Texas DATE: START 11-8-89 FINISH 11-8-89

GEOLOGIST: Robert Sherrill DRILLER: Choate Well Service DRILL RIG TYPE: Failing 1000

MEASURED GROUNDWATER LEVEL: DEPTH _____ DATE _____ TIME _____ REF. _____

DRILLING METHODS: Air Rotary Drilling Ground level elevation (msl) = 2483.9

COMMENTS Top of saturation at 87.4 feet below grade

ELEVATION (FT.MSL)	DEPTH (FT.)	SAMPLE TYPE (1)	SAMPLE NO.	RECOVERY (2)	HNu READING	SYMBOL (4)	STRATIGRAPHY	SAMPLE DESCRIPTION	DISCOLORATION	ODOR	% PASSING NO. 200 SIEVE	MOISTURE CONTENT: NATURAL	MOISTURE CONTENT: LIQ. LIMIT	MOISTURE CONTENT: PLAS. INDEX
2483.9	0													
2480		X	1	1.5	0.1	SP		Sand – uniform fine sand, loose, red, dry, very slight odor						
	10													
2470		X	2	1.5	0.0	SP		Sand – similar to above except no odor						
	20													
2460		X	3	1.5	0.0	SP		Sand – similar to above						
	30													
2450		X	4	1.5	0.0	SP		Sand – similar to above except with 20% weak calcareous cement, white, no odor						
	40													
2440		X	5	1.5	0.0	SP		Sand – similar to above						
	50													
2450		X	6	1.5	0.0	SP		Sand – similar to above except with 10% weak calcareous cement						
	60													
2420		X	7	1.5	0.0	SP		Sand – similar to above except with 30% weak calcareous cement						
	70													
2410		X	8	1.5	0.0	SP		Sand – uniform fine sand, loose, red, dry, no odor						
	80													
2400		X	9	1.5	0.0	SP		Sand – similar to above						
	90													
2390		X	10	1.5	2.1	SP		Sand – similar to above except saturated, moderate odor						
	100							Boring Terminated 95.4 feet below grade						

(1) SHELBY TUBE, SPLIT SPOON, ROCK CORE OR GRAB
(2) LENGTH OF SAMPLE RECOVERED
(3) STD. PENETRATION RESISTANCE BLOWS/FT.
(4) UNIFIED SOIL CLASSIFICATION SYSTEM

LOG OF BORING

BORING NO. E-12

CLIENT: Fina Oil and Chemical Company JOB NO. 119505 SHEET 1 of 1

SITE: Big Spring, Texas DATE: START 11-9-89 FINISH 11-9-89

GEOLOGIST: Robert Sherrill DRILLER: Choate Well Service DRILL RIG TYPE: Failing 1000

MEASURED GROUNDWATER LEVEL: DEPTH _____ DATE _____ TIME _____ REF. _____

DRILLING METHODS: Air Rotary Drilling Ground level elevation (msl) = 2482.3

COMMENTS Top of saturation at 90.3 feet below grade

ELEVATION (FT.MSL)	DEPTH (FT.)	SAMPLE TYPE (1)	SAMPLE NO.	RECOVERY (2)	HNu READING	SYMBOL (4)	STRATIGRAPHY	SAMPLE DESCRIPTION	DISCOLORATION	ODOR	% PASSING NO. 200 SIEVE	MOISTURE CONTENT: NATURAL	MOISTURE CONTENT: LIQ. LIMIT	MOISTURE CONTENT: PLAS. INDEX
2482.3	0													
2480			1	1.5	0.0	F		Sand Fill – uniform fine sand, loose to compact, red, dry, no odor						
	10													
2470			2	1.5	0.0	SP		Sand – uniform very fine sand, loose to compact, red, damp, no odor						
	20													
2460			3	1.5	0.0	SP		Sand – uniform fine sand, loose, red, dry, no odor						
	30													
2450			4	1.5	0.0	SP		Sand – similar to above						
	40													
2440			5	1.5	0.0	SP		Sand – similar to above						
	50													
2430			6	1.5	0.0	SP		Sand – similar to above						
	60													
2420			7	1.5	0.0	SP		Sand – similar to above						
	70													
2410			8	1.5	0.0	SP		Sand – similar to above						
	80													
2400			9	1.5	0.0	SP		Sand – similar to above						
	90													
2390			10	1.5	1.4	O		Sand – similar to above except saturated, moderate odor						
	100							Boring Terminated 93.8 feet below grade						

(1) SHELBY TUBE, SPLIT SPOON, ROCK CORE OR GRAB
(2) LENGTH OF SAMPLE RECOVERED
(3) STD. PENETRATION RESISTANCE BLOWS/FT.
(4) UNIFIED SOIL CLASSIFICATION SYSTEM

LOG OF BORING

BORING NO. E-13

CLIENT: Fina Oil and Chemical Company JOB NO. 119505 SHEET 1 of 1

SITE: Big Spring, Texas DATE: START 11-8-89 FINISH 11-8-89

GEOLOGIST: Robert Sherrill DRILLER: Choate Well Service DRILL RIG TYPE: Failing 1000

MEASURED GROUNDWATER LEVEL: DEPTH _____ DATE _____ TIME _____ REF. _____

DRILLING METHODS: Air Rotary Drilling Ground level elevation (msl) = 2472.0

COMMENTS Top of saturation at 80.9 feet below grade

ELEVATION (FT.MSL)	DEPTH (FT.)	SAMPLE TYPE (1)	SAMPLE NO.	RECOVERY (2)	HNu READING	SYMBOL (4)	STRATIGRAPHY	SAMPLE DESCRIPTION	DISCOLORATION	ODOR	% PASSING NO. 200 SIEVE	MOISTURE CONTENT: NATURAL	MOISTURE CONTENT: LIQ. LIMIT	MOISTURE CONTENT: PLAS. INDEX
2472.0	0													
2470			1	1.5	0.0	SP		Sand – uniform very fine sand, with <5% silt in matrix, compact, red, dry, no odor						
	10													
2460			2	1.5	0.0	SP		Sand – uniform fine grain, loose, dry, red, no odor						
	20													
2450			3	1.5	0.0	SP		Sand – similar to above						
	30													
2440			4	1.5	0.0	SP		Sand – similar to above						
	40													
2430			5	1.5	0.0	SP		Sand – similar to above except with 10% weak calcareous cement						
	50													
2420			6	1.5	0.0	SP		Sand – similar to above						
	60													
2410			7	1.5	0.0	SP		Sand – similar to above except no calcareous cement						
	70													
2400			8	1.5	0.0	SP		Sand – similar to above						
	80													
2390			9	1.5	0.5			Sand – similar to above except saturated, slight odor						
	90							Boring Terminated at 83.5 feet below grade						
	100													

(1) SHELBY TUBE, SPLIT SPOON, ROCK CORE OR GRAB
(2) LENGTH OF SAMPLE RECOVERED
(3) STD. PENETRATION RESISTANCE BLOWS/FT.
(4) UNIFIED SOIL CLASSIFICATION SYSTEM

LOG OF BORING

BORING NO. E-14

CLIENT: Fina Oil and Chemical Company JOB NO. 119505 SHEET 1 of 1

SITE: Big Spring, Texas DATE: START 11-8-89 FINISH 11-8-89

GEOLOGIST: Robert Sherrill DRILLER: Choate Well Service DRILL RIG TYPE: Failing 1000

MEASURED GROUNDWATER LEVEL: DEPTH ____ DATE ____ TIME ____ REF. ____

DRILLING METHODS: Air Rotary Drilling Ground level elevation (msl) = 2475.8

COMMENTS Top of saturation at 84.9 feet below grade

ELEVATION (FT.MSL)	DEPTH (FT.)	SAMPLE TYPE (1)	SAMPLE NO.	RECOVERY (2)	HNu READING	SYMBOL (4)	STRATIGRAPHY	SAMPLE DESCRIPTION	DISCOLORATION	ODOR	% PASSING NO. 200 SIEVE	MOISTURE CONTENT: NATURAL	MOISTURE CONTENT: LIQ. LIMIT	MOISTURE CONTENT: PLAS. INDEX
2475.8	0													
2470		X	1	1.5	6.0	SP		Sand - uniform fine sand, compact, black, dry, moderate odor						
	10													
2460		X	2	1.5	5.7	SP		Sand - uniform fine sand, loose, red, dry, with black spots moderate odor						
	20													
2450		X	3	1.5	0.0	SP		Sand - similar to above except no discoloration, very slight odor						
	30													
2440		X	4	1.5	0.0	SP		Sand - similar to above						
	40													
2430		X	5	1.5	0.0	SP		Sand - similar to above						
	50													
2420		X	6	1.5	0.0	SP		Sand - uniform grading, fine sand, with 15% calcareous cement, compact, pink, dry, no odor						
	60													
2410		X	7	1.5	0.0	SP		Sand - similar to above except with 5% calcareous cement						
	70													
2400		X	8	1.5	0.0	SP		Sand - similar to above						
	80													
2390		X	9	1.5	3.1	SP		Sand - similar to above except saturated, moderate odor						
	90							Boring Terminated 87.3 feet below grade						
	100													

(1) SHELBY TUBE, SPLIT SPOON, ROCK CORE OR GRAB
(2) LENGTH OF SAMPLE RECOVERED
(3) STD. PENETRATION RESISTANCE BLOWS/FT.
(4) UNIFIED SOIL CLASSIFICATION SYSTEM

LOG OF BORING

BORING NO. B-15

CLIENT: Fina Oil and Chemical Company JOB NO. 119505 SHEET 1 of 1

SITE: Big Spring, Texas DATE: START 11-7-89 FINISH 11-7-89

GEOLOGIST: Robert Sherrill DRILLER: Choate Well Service DRILL RIG TYPE: Failing 1000

MEASURED GROUNDWATER LEVEL: DEPTH ____ DATE ____ TIME ____ REF. ____

DRILLING METHODS: Air Rotary Drilling Ground level elevation (msl) = 2481.4

COMMENTS Top of saturation at 83.4 feet below grade

ELEVATION (FT.MSL)	DEPTH (FT.)	SAMPLE TYPE (1)	SAMPLE NO.	RECOVERY (2)	HNu READING	SYMBOL (4)	STRATIGRAPHY	SAMPLE DESCRIPTION	DISCOLORATION	ODOR	% PASSING NO. 200 SIEVE	MOISTURE CONTENT: NATURAL	MOISTURE CONTENT: LIQ. LIMIT	MOISTURE CONTENT: PLAS. INDEX
2481.4	0													
2480		X	1	1.5	18	SM		Silty Sand - poorly graded, uniform fine sand with 20% silt, cohesive, damp with oil						
	10													
2470		X	2	1.5	18	SP		Sand - uniform fine sand, loose, red, dry, strong odor						
2460	20	X	3	1.5	17	SP		Sand - similar to above, strong odor						
2450	30	X	4	1.5	9.0			Sand - similar to above, strong odor						
						SS		Sandstone - dense, unweathered, 40% calcareous cement						
2440	40	X	5	1.5	0.0	SP		Sand - uniform fine sand, with 20% moderate calcareous cement						
2430	50	X	6	1.5	0.0	SP		Sand - similar to above except no calcareous cement						
2420	60	X	7	1.5	0.0	SP		Sand - similar to above						
2410	70	X	8	1.5	0.0	SP		Sand - similar to above						
2400	80	X	9	1.5	3.1	SP		Sand - similar to above except damp, moderate odor ▼						
2390	90	X	10	1.5	2.6	SP		Sand - similar to above except saturated						
								Boring Terminated 92.9 feet below grade						

(1) SHELBY TUBE, SPLIT SPOON, ROCK CORE OR GRAB
(2) LENGTH OF SAMPLE RECOVERED
(3) STD. PENETRATION RESISTANCE BLOWS/FT.
(4) UNIFIED SOIL CLASSIFICATION SYSTEM

LOG OF BORING

BORING NO. E-16

CLIENT: Fina Oil and Chemical Company JOB NO. 119505 SHEET 1 of 1

SITE: Big Spring, Texas DATE: START 11-7-89 FINISH 11-8-89

GEOLOGIST: Robert Sherrill DRILLER: Choate Well Service DRILL RIG TYPE: Failing 1000

MEASURED GROUNDWATER LEVEL: DEPTH _____ DATE _____ TIME _____ REF. _____

DRILLING METHODS: Air Rotary Drilling Ground level elevation (msl) = 2483.8

COMMENTS Top of saturation at 88.2 feet below grade

ELEVATION (FT.MSL)	DEPTH (FT.)	SAMPLE TYPE (1)	SAMPLE NO.	RECOVERY (2)	HNu READING	SYMBOL (4)	STRATIGRAPHY	SAMPLE DESCRIPTION	DISCOLORATION	ODOR	% PASSING NO. 200 SIEVE	MOISTURE CONTENT: NATURAL	MOISTURE CONTENT: LIQ. LIMIT	MOISTURE CONTENT: PLAS. INDEX
2483.8	0													
2480		X	1	1.5	30	SM		Silty Sand – poorly graded, with 25% silt, cohesive to dense, moist with oil, strong odor						
	10													
2470		X	2	1.5	10.4	SP		Sand – uniform fine sand, loose, red, dry, strong odor						
	20													
2460		X	3	1.5	0.1	SP		Sand – similar to above except spots of oil, red, loose, dry, moderate odor						
	30													
2450		X	4	1.5	0.2	SP		Sand – similar to above, spots of oil						
	40													
2440		X	5	1.5	0.0	SP		Sand – uniform fine sand, with 10% weak calcareous cement, compact, pink, dry, slight odor						
	50													
2430		X	6	1.5	0.0	SP		Sand – similar to above except with 20% calcareous cement, very slight odor						
	60													
2420		X	7	1.5	0.0	SS		Sandstone – dense, unweathered, with 40% calcareous cement (well cemented) white, no odor						
	70													
2410		X	8	1.5	0.0	SP		Sand – uniform fine sand, loose, red, dry, no odor						
	80													
2400		X	9	1.5	0.0	SP		Sand – similar to above						
	90													
2390		X	10	1.5	2.3	SP		Sand – similar to above except saturated, moderate odor						
	100							Boring Terminated 95.3 feet below grade						

(1) SHELBY TUBE, SPLIT SPOON, ROCK CORE OR GRAB
(2) LENGTH OF SAMPLE RECOVERED
(3) STD. PENETRATION RESISTANCE BLOWS/FT.
(4) UNIFIED SOIL CLASSIFICATION SYSTEM

LOG OF BORING

BORING NO. E-17/

CLIENT: Fina Oil and Chemical Company JOB NO. 119505 SHEET 1 of 1

SITE: Big Spring, Texas DATE: START 11-6-89 FINISH 11-6-89

GEOLOGIST: Robert Sherrill DRILLER: Choate Well Service DRILL RIG TYPE: Failing 1000

MEASURED GROUNDWATER LEVEL: DEPTH _____ DATE _____ TIME _____ REF. _____

DRILLING METHODS: Air Rotary Drilling Ground level elevation (msl) = 2488.4

COMMENTS Top of saturation at 93.6 feet below grade

ELEVATION (FT.MSL)	DEPTH (FT.)	SAMPLE TYPE (1)	SAMPLE NO.	RECOVERY (2)	HNu READING	SYMBOL (4)	STRATIGRAPHY	SAMPLE DESCRIPTION	DISCOLORATION	ODOR	% PASSING NO. 200 SIEVE	MOISTURE CONTENT: NATURAL	MOISTURE CONTENT: LIQ. LIMIT	MOISTURE CONTENT: PLAS. INDEX
2488.4	0													
2480	10		1	1.5	23	SM		Silty Sand – poorly graded, very fine sand, with 10–15% silt in matrix cohesive, black, damp with oil, very strong odor						
2470	20		2	1.5	21	SP		Sand – poorly graded, uniform fine sand, loose, red, dry, strong odor						
2460	30		3	1.5	1.9	SP		Sand – similar to above except slight odor						
2450	40		4	1.5	0.0	SP		Sand – similar to above except minor calcareous cement (36 to 43 feet) no odor						
2440	50		5	1.5	0.0	SP		Sand – similar to above						
2430	60		6	1.5	0.0	SP		Sand – similar to above						
2420	70		7	1.5	0.0	SP		Sand – similar to above except 10% weak calcareous cement						
2410	80		8	1.5	0.0	SP		Sand – similar to above						
2400	90		9	1.5	0.0	SP		Sand – similar to above						
2390	100		10	1.5	0.4	SP		Sand – similar to above except saturated, moderate odor						
								Boring Terminated 99.9 feet below grade						

(1) SHELBY TUBE, SPLIT SPOON, ROCK CORE OR GRAB
(2) LENGTH OF SAMPLE RECOVERED
(3) STD. PENETRATION RESISTANCE BLOWS/FT.
(4) UNIFIED SOIL CLASSIFICATION SYSTEM

LOG OF BORING

BORING NO. E-18

CLIENT: Fina Oil and Chemical Company JOB NO. 119505 SHEET 1 of 1

SITE: Big Spring, Texas DATE: START 11-7-89 FINISH 11-7-89

GEOLOGIST: Robert Sherrill DRILLER: Choate Well Service DRILL RIG TYPE: Failing 1000

MEASURED GROUNDWATER LEVEL: DEPTH _____ DATE _____ TIME _____ REF. _____

DRILLING METHODS: Air Rotary Drilling Ground level elevation (msl) = 2481.6

COMMENTS Top of saturation at 86.7 feet below grade

ELEVATION (FT.MSL)	DEPTH (FT.)	SAMPLE TYPE (1)	SAMPLE NO.	RECOVERY (2)	HNu READING	SYMBOL (4)	STRATIGRAPHY	SAMPLE DESCRIPTION	DISCOLORATION	ODOR	% PASSING NO. 200 SIEVE	MOISTURE CONTENT: NATURAL	MOISTURE CONTENT: LIQ. LIMIT	MOISTURE CONTENT: PLAS. INDEX
2481.6	0													
2480			1	1.5	22	SM		Silty Sand – uniform fine sand, with 30% silt in matrix, cohesive, black, moist with oil						
	10													
2470			2	1.5	2.3	SP		Sand – uniform fine sand, loose, red, dry, moderate odor						
2460	20		3	1.5	0.3	SP		Sand – similar to above except slight odor						
2450	30		4	1.5	0.0	SP		Sand – similar to above except very slight odor						
						SS		Sandstone – dense unweathered with 40% calcareous cement (well cemented)						
2440	40		5	1.5	0.0	SP		Sand – uniform fine sand, loose, red, dry, very slight odor						
2430	50		6	1.5	0.0	SP		Sand – similar to above except no odor						
2420	60		7	1.5	0.0	SP		Sand – similar to above except with 5% weak calcareous cement						
2410	70		8	1.5	0.0	SP		Sand – similar to above						
2400	80		9	1.5	0.0	SP		Sand – similar to above						
2390	90		10	1.5	0.0	SP		Sand – similar to above except saturated, moderate odor						
	100							Boring Terminated 93.1 feet below grade						

(1) SHELBY TUBE, SPLIT SPOON, ROCK CORE OR GRAB
(2) LENGTH OF SAMPLE RECOVERED
(3) STD. PENETRATION RESISTANCE BLOWS/FT.
(4) UNIFIED SOIL CLASSIFICATION SYSTEM

LOG OF BORING

BORING NO. E-19

CLIENT: Fina Oil and Chemical Company JOB NO. 119505 SHEET 1 of 1

SITE: Big Spring, Texas DATE: START 11-7-89 FINISH 11-7-89

GEOLOGIST: Robert Sherrill DRILLER: Choate Well Service DRILL RIG TYPE: Failing 1000

MEASURED GROUNDWATER LEVEL: DEPTH ____ DATE ____ TIME ____ REF. ____

DRILLING METHODS: Air Rotary Drilling Ground level elevation (msl) = 2485.1

COMMENTS Top of saturation at 90.4 feet below grade

ELEVATION (FT.MSL)	DEPTH (FT.)	SAMPLE TYPE (1)	SAMPLE NO.	RECOVERY (2)	HNu READING	SYMBOL (4)	STRATIGRAPHY	SAMPLE DESCRIPTION	DISCOLORATION	ODOR	% PASSING NO. 200 SIEVE	MOISTURE CONTENT: NATURAL	MOISTURE CONTENT: LIQ. LIMIT	MOISTURE CONTENT: PLAS. INDEX
2485.1	0													
2480	10		1	1.5	23	SM		Silty Sand – poorly graded, very fine sand, with 30% silt cohesive, black, moist with oil, very strong odor						
2470	20		2	1.5	1.0	SP		Sand – uniform very fine to fine sand, loose, red, dry, very slight odor						
2460	30		3	1.5	0.1	SP		Sand – similar to above except with minor calcareous nodules, no odor						
2450	40		4	1.5	0.0	SP		Sand – similar to above except no calcareous nodules						
2440	50		5	1.5	0.0	SP		Sand – similar to above						
2430	60		6	1.5	0.0	SP		Sand – similar to above						
2420	70		7	1.5	0.0	SP		Sand – similar to above						
2410	80		8	1.5	0.0	SP		Sand – similar to above						
2400	90		9	1.5	0.0	SP		Sand – similar to above						
2390	100		10	1.5	0.5	SP		Sand – similar to above except saturated, moderate odor						
								Boring Terminated 96.6 feet below grade						

(1) SHELBY TUBE, SPLIT SPOON, ROCK CORE OR GRAB
(2) LENGTH OF SAMPLE RECOVERED
(3) STD. PENETRATION RESISTANCE BLOWS/FT.
(4) UNIFIED SOIL CLASSIFICATION SYSTEM

LOG OF BORING

BORING NO. B-20

CLIENT: Fina Oil and Chemical Company JOB NO. 119505 SHEET 1 of 1

SITE: Big Spring, Texas DATE: START 11-9-89 FINISH 11-9-89

GEOLOGIST: Robert Sherrill DRILLER: Choate Well Service DRILL RIG TYPE: Failing 1000

MEASURED GROUNDWATER LEVEL: DEPTH _____ DATE _____ TIME _____ REF. _____

DRILLING METHODS: Air Rotary Drilling Ground level elevation (msl) = 2482.2

COMMENTS Top of saturation at 89.0 feet below grade

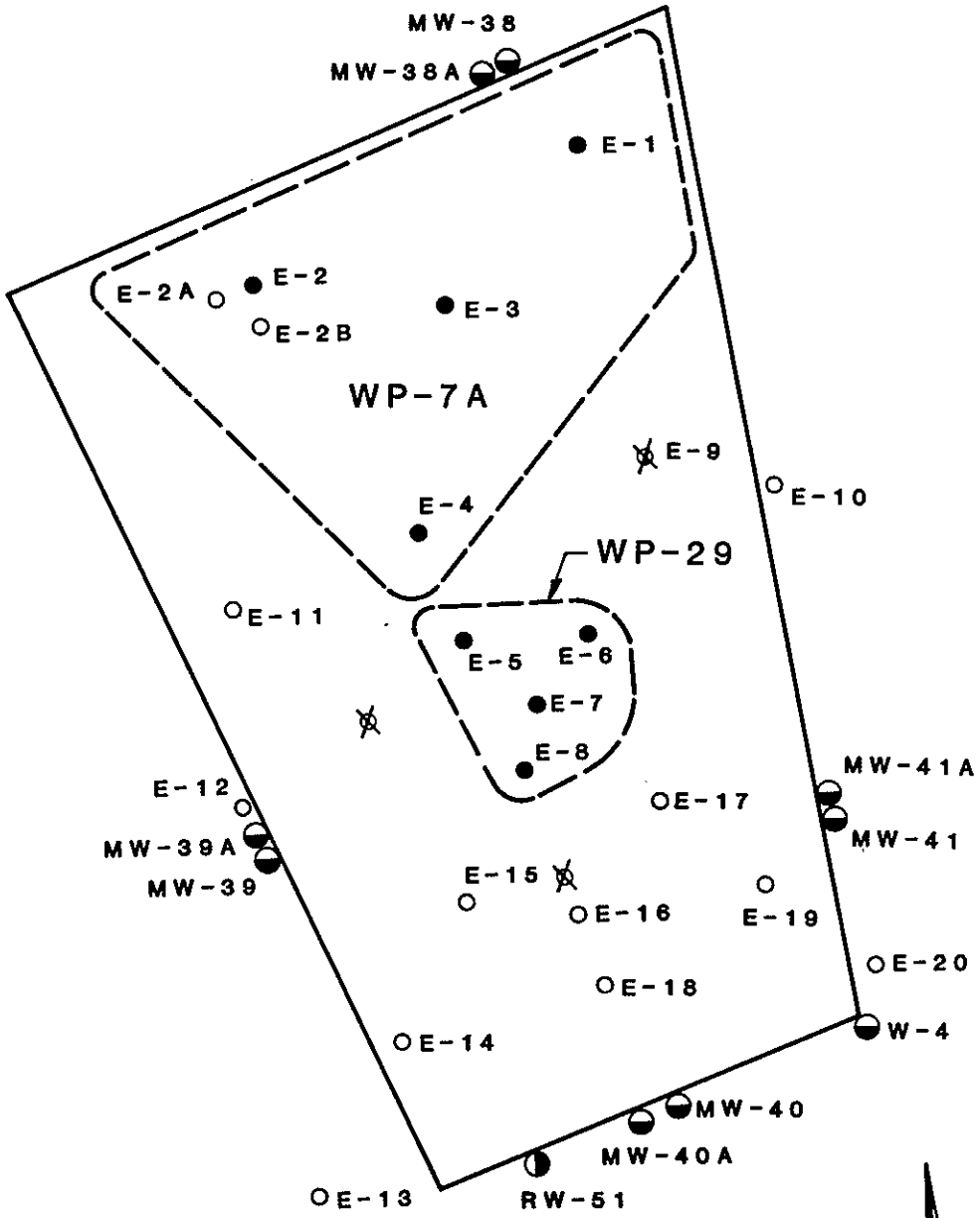
ELEVATION (FT.MSL)	DEPTH (FT.)	SAMPLE TYPE (1)	SAMPLE NO.	RECOVERY (2)	HNu READING	SYMBOL (4)	STRATIGRAPHY	SAMPLE DESCRIPTION	DISCOLORATION	ODOR	% PASSING NO. 200 SIEVE	MOISTURE CONTENT: NATURAL	MOISTURE CONTENT: LIQ. LIMIT	MOISTURE CONTENT: PLAS. INDEX
2482.2	0													
2480			1	1.5	0.0	SP		Sand - uniform fine sand, loose, red, dry, no odor						
	10													
2470			2	1.5	0.0	SP		Sand - similar to above						
	20													
2460			3	1.5	0.0	SP		Sand - similar to above						
	30													
2450			4	1.5	0.0	SP		Sand - similar to above						
	40													
2440			5	1.5	0.0	SP		Sand - similar to above						
	50													
2430			6	1.5	0.0	SP		Sand - similar to above						
	60													
2420			7	1.5	0.0	SP		Sand - similar to above						
	70													
2410			8	1.5	0.0	SP		Sand - similar to above						
	80													
2400			9	1.5	0.0	SP		Sand - similar to above						
	90													
2390			10	1.5	2.0	SP		Sand - similar to above except saturated, moderate odor						
	100							Boring Terminated at 93.7 feet below grade						

(1) SHELBY TUBE, SPLIT SPOON, ROCK CORE OR GRAB
(2) LENGTH OF SAMPLE RECOVERED
(3) STD. PENETRATION RESISTANCE BLOWS/FT.
(4) UNIFIED SOIL CLASSIFICATION SYSTEM

Part B Geology Report

ATTACHMENT VI.4.a

1989 PHASE II
SITE E SOIL BORING LOGS



LEGEND

- ● RFI SOIL BORINGS WITHIN THE SWMUs
- ○ ADDITIONAL SOIL BORINGS OUTSIDE THE SWMUs
- ◒ EXISTING MONITOR WELL

SCALE IN FEET

0 50 100 200

FIGURE 2

PROPOSED SOIL BORINGS FOR THE SITE E LTU

FINA OIL & CHEMICAL COMPANY

JONES AND NEUSE, INC.
Engineering and Environmental Consultants

FINA OIL AND CHEMICAL COMPANY
Big Spring, Texas

SITE E INVESTIGATION

Boring No.: E-1
Ground Level Elevation: 2496.0 feet mean sea level
Date: August 17, 1989
Discoloration: 0 to 7.0 feet
Odor: 0 to 18.5 feet
Top Of Saturation: 98.0 feet

Depth (feet)	Depth (msl)	HNU (reading)	HNU (scale)	Time	Description
16.0	2480	0.5	10	0745	SAND, uniform very fine, loose red, dry
26.0	2470	0.1	1	0835	SAND, fine grain, 30% weak calcareous cement, loose, pink, dry
36.0	2460	0	1	0850	SAND, uniform fine, loose, red, dry
46.0	2450	0.2	1	0900	SAND, similar to above
56.0	2440	0.1	1	0930	SANDSTONE, dense, well cemented, 40% calcareous cement, white and pink, dry
66.0	2430	0	1	0955	SANDSTONE, moderatly dense, white and pink, 25% calcareous cement, dry
76.0	2420	0	1	1005	SANDSTONE, similar to above
86.0	2410	0	1	1025	SAND, uniform fine, compact, pink, dry
96.0	2400	0.2	1	1045	SAND, uniform fine, loose, red, damp
106.0	2390	0.5	1	1105	SAND, similar to above except saturated

FINA OIL AND CHEMICAL COMPANY
Big Spring, Texas

SITE E INVESTIGATION

Boring No.: E-2
Ground Level Elevation: 2494.9 feet mean sea level
Date: August 17,1989
Discoloration: 0 to 4.6 feet, 6.5 to 26.5 feet
Odor: 0 to 86.7 feet
Top Of Saturation: 98.9 feet

Depth (feet)	Depth (msl)	HNU (reading)	HNU (scale)	Time	Description
4.9	2490	4.8	10	1600	SAND, uniform fine, loose, black, moist
14.9	2480	5.2	10	1610	SAND, similar to above except compact
24.9	2470	2.9	10	1620	SAND, uniform fine, loose, tan and black, dry
34.9	2460	2.6	10	1655	SAND, uniform fine, loose, red, dry
44.9	2450	4.8	10	1815	SAND, similar to above
54.9	2440	3.3	10	1825	SAND, similar to above except compact
64.9	2430	5.0	10	1845	SAND, similar to above
74.9	2420	4.0	10	1900	SAND, similar to above except with 10% weak calcareous cement
84.9	2410	2.8	10	1915	SAND, similar to above except with 10% weak calcareous cement
94.9	2400	0.6	1	1930	SAND, similar to above
104.9	2390	0.8	100	2000	SAND. similar to above except saturated

FINA OIL AND CHEMICAL COMPANY
Big Spring, Texas

SITE E INVESTIGATION

Boring No.: E-2A
Ground Level Elevation: 2494.3 feet mean sea level
Date: November 10, 1989
Discoloration: 0 to 44.0 feet (black), 44.0-53.0 feet (grey)
Odor: 0 to 98 feet
Top Of Saturation: 96.0 feet

Depth (feet)	Depth (msl)	HNU (reading)	HNU (scale)	Time	Description
64.3	2430	2.8	1	1133	SAND, uniform fine grain, loose, red, minor calcareous nodules, slight odor (SP)
74.3	2430	1.3	1	1144	SAND, similar to above except red and white, 5% weak calcareous cement, very slight odor (SP)
84.3	2420	1.6	1	1200	SAND, similar to above, (SP)
94.3	2410	1.4	1	1212	SAND, similar to above except damp, (SP)

FINA OIL AND CHEMICAL COMPANY
Big Spring, Texas

SITE E INVESTIGATION

Boring No.: E-2B
Ground Level Elevation: 2494.9 feet mean sea level
Date: November 10, 1989
Discoloration: 0 to 34.0 feet (black), 34.0-36.0 feet (black spots)
Odor: 0 to 96 feet
Top Of Saturation: 95.4 feet

Depth (feet)	Depth (msl)	HNU (reading)	HNU (scale)	Time	Description
34.9	2460	4.1	10	0750	SAND, uniform fine grain, compact to loose, red with black spots, dry, strong odor (SP)
44.9	2450	4.0	10	1407	SAND, similar to above except no discoloration (SP)
54.9	2440	3.8	10	1417	SAND, similar to above except 5% calcareous cement (SP)
64.9	2430	1.6	1	1427	SAND, similar to above except slight odor (SP)
74.9	2420	3.8	1	1437	SAND, similar to above (SP)
84.9	2410	1.8	1	1450	SAND, similar to above except very slight odor (SP)
94.9	2400	2.0	1	1504	SAND, similar to above except moist, slight odor (SP)

FINA OIL AND CHEMICAL COMPANY
Big Spring, Texas

SITE E INVESTIGATION

Boring No.: E-3
Ground Level Elevation: 2496.2 feet mean sea level
Date: August 17, 1989
Discoloration: 0 to 14 feet
Odor: 0 to 58 feet
Top Of Saturation: 98 feet

Depth (feet)	Depth (msl)	HNU (reading)	HNU (scale)	Time	Description
16.2	2480	2.1	10	0945	SAND, poorly graded, loose, dry
26.2	2470	1.6	1	1025	SAND, similar to above
36.2	2460	1.3	1	1045	SAND, similar to above
46.2	2450	0.2	1	1105	SAND, similar to above
56.2	2440	0.8	1	1135	SANDSTONE, weak cement, moderatly dense, white, dry
66.2	2430	0.3	1	1200	SANDSTONE, moderate cement, mod. dense, white, dry
76.2	2420	0.1	1	1300	SAND, poorly graded, compact, red, dry
86.2	2410	0.0	1	1320	SAND, similar to above
96.2	2400	0.0	1	1350	SAND, similar to above except damp
106.2	2390	0.1	1	1420	SAND, similar to above except saturated

FINA OIL AND CHEMICAL COMPANY
Big Spring, Texas

SITE E INVESTIGATION

Boring No.: E-4
Ground Level Elevation: 2492.4 feet mean sea level
Date: August 18, 1989
Discoloration: 0 to 15 feet
Odor: 0 to 26 feet
Top Of Saturation: 98.7 feet

Depth (feet)	Depth (msl)	HNU (reading)	HNU (scale)	Time	Description
2.4	2490	8.1	10	1310	SAND, uniform fine, compact, black, moist
12.4	2480	1.2	10	1325	SAND, uniform fine, loose, black with red streaks, damp
22.4	2470	0.1	1	1400	SAND, uniform fine, loose, red, dry
32.4	2460	0	1	1455	SAND, similar to above
42.4	2450	0	1	1510	SAND, similar to above
52.4	2440	0	1	1520	SAND, similar to above
62.4	2430	0	1	1535	SAND, similar to above except 10% very poor calcareous cement
72.4	2420	0	1	1555	SAND, similar to above
82.4	2410	0	1	1610	SAND, similar to above
92.4	2400	0	1	1630	SAND, similar to above
102.4	2390	2.1	1	1655	SAND, uniform fine, loose, gray, saturated

FINA OIL AND CHEMICAL COMPANY
Big Spring, Texas

SITE E INVESTIGATION

Boring No.: E-5
Ground Level Elevation: 2489.9 feet mean sea level
Date: August 19, 1989
Discoloration: 0 to 28.0 feet
Odor: 0 to 32.5 feet
Top Of Saturation: 94.7 feet

Depth (feet)	Depth (msl)	HNU (reading)	HNU (scale)	Time	Description
9.9	2480	2.6	10	0805	SAND, uniform fine, dense, black, saturated with oil
19.9	2470	0.9	10	0825	SAND, uniform fine, compact, blackish red, damp
29.9	2460	8.2	1	0835	SAND, uniform fine, loose, red, dry
39.9	2450	0	1	0940	SAND, similar to above
49.9	2440	0	1	0955	SANDSTONE, moderately dense, 40% calcareous cement, pink, dry
59.9	2430	0	1	1005	SAND, uniform fine, compact, 15% very poor calcareous cement, pink, dry
69.9	2420	0	1	1015	SAND, similar to above
79.9	2410	0	1	1030	SAND, similar to above
89.9	2400	0	1	1045	SAND, similar to above
99.9	2390	1.0	1	1100	SAND, similar to above except saturated

FINA OIL AND CHEMICAL COMPANY
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SITE E INVESTIGATION

Boring No.: E-6
Ground Level Elevation: 2491.6 feet mean sea level
Date: August 19, 1989
Discoloration: 0 to 15.3 feet
Odor: 0 to 19.0 feet
Top Of Saturation: 97.5 feet

Depth (feet)	Depth (msl)	HNU (reading)	HNU (scale)	Time	Description
11.6	2480	0.8	10	1140	SAND, uniform fine, dense, black and red, moist
21.6	2470	0	1	1155	SAND, uniform very fine, loose, red, dry
31.6	2460	0	1	1225	SAND, similar to above
41.6	2450	0	1	1405	SAND, uniform fine with 10% poor calcareous cement, compact, red, dry
51.6	2440	0	1	1410	SAND, similar to above
61.6	2430	0	1	1425	SAND, similar to above
71.6	2420	0	1	1440	SAND, similar to above
81.6	2410	0	1	1450	SAND, similar to above
91.6	2400	0	1	1505	SAND. similar to above
101.6	2390	2.1	1	1520	SAND, uniform fine, loose, gray, saturated loose, red, saturated

FINA OIL AND CHEMICAL COMPANY
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SITE E INVESTIGATION

Boring No.: E-7
Ground Level Elevation: 2489.5 feet mean sea level
Date: August 18, 1989
Discoloration: 0 to 13.7 feet
Odor: 0 to 22 feet
Top Of Saturation: 95.7 feet

Depth (feet)	Depth (msl)	HNU (reading)	HNU (scale)	Time	Description
9.5	2480	10.0	1	1610	SAND, poorly graded, compact black, damp
19.5	2470	1.2	1	1615	SAND, poorly graded, loose, red, dry
29.5	2460	0.0	1	1645	SAND, similar to above
39.5	2450	0.0	1	1655	SAND, similar to above
49.5	2440	0.0	1	1720	SAND, similar to above
59.5	2430	0.0	1	1730	SAND, similar to above except 20% mod. calcareous cement
69.5	2420	0.0	1	1740	SAND, similar to above
79.5	2410	0.0	1	1755	SAND, similar to above
89.5	2400	0.0	1	1815	SAND, similar to above
99.5	2390	4.5	1	1835	SAND, similar to above except saturated

FINA OIL AND CHEMICAL COMPANY
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SITE E INVESTIGATION

Boring No.: E-8
Ground Level Elevation: 2486.6 feet mean sea level
Date: August 20, 1989
Discoloration: 0 to 18 feet
Odor: 0 to 19.6 feet
Top Of Saturation: 88.2 feet

Depth (feet)	Depth (msl)	HNU (reading)	HNU (scale)	Time	Description
6.6	2480	11.8	10	0755	SAND, uniform fine. dense, black, moist
16.6	2470	0.4	1	0800	SAND, uniform fine, compact, red with black streaks, dry
26.6	2460	0	1	0810	SAND, uniform very fine, loose, red, dry
36.6	2450	0	1	0855	SAND, similar to above
46.6	2440	0	1	0905	SANDSTONE, medium dense with 30% calcareous cement, fine grain texture, white and pink, dry
56.6	2430	0	1	0915	SANDSTONE, similar to above
66.6	2420	0	1	0935	SANDSTONE, similar to above
76.6	2410	0	1	0950	SAND, uniform fine, loose, red, dry
86.6	2400	0.1	1	1005	SAND, similar to above except moist
96.6	2390	0.6	1	1020	SAND, similar to above except saturated

FINA OIL AND CHEMICAL COMPANY
Big Spring, Texas

SITE E INVESTIGATION

Boring No.: E-10
Ground Level Elevation: 2489.1 feet mean sea level
Date: November 9, 1989
Discoloration: NONE
Odor: NONE
Top Of Saturation: 90.8 feet

Depth (feet)	Depth (msl)	HNU (reading)	HNU (scale)	Time	Description
9.1	2480	0	1	0721	SAND, uniform fine grain, loose, red, dry, no odor (SP)
19.1	2470	0	1	0725	SAND, similar to above (SP)
29.1	2460	0	1	0730	SAND, similar to above (SP)
39.1	2450	0	1	0738	SAND, similar to above (SP) (from 39.1 to 40.5) SANDSTONE, dense, 40% moderate calcareous cement, unweathered white, dry, no odor (Ss) (bottom of sandstone at 47.3)
49.1	2440	0	1	0745	SAND, uniform fine grain, loose red, dry, no odor (SP)
59.1	2430	0	1	0754	SAND, similar to above except 5% calcareous nodules (SP)
69.1	2420	0	1	0804	SAND, similiar to above except no calcareous nodules (SP)
79.1	2410	0	1	0814	SAND, similar to above (SP)
89.1	2400	0.1	1	0827	SAND, similar to above except damp, slight odor (SP)
99.1	2390	1.8	1	0843	SAND, similar to above except saturated, strong odor, (SP)

FINA OIL AND CHEMICAL COMPANY
Big Spring, Texas

SITE E INVESTIGATION

Boring No.: E-11
Ground Level Elevation: 2483.9 feet mean sea level
Date: November 8, 1989
Discoloration: 0 to 3.3 feet (black)
Odor: 0 to 8 feet
Top Of Saturation: 87.4 feet

Depth (feet)	Depth (msl)	HNU (reading)	HNU (scale)	Time	Description
3.9	2480	0.1	1	1437	SAND, uniform fine grain, loose, red dry, very slight odor (SP)
13.9	2470	0	1	1454	SAND, similar to above except no odor, (SP)
23.9	2460	0	1	1459	SAND, similar to above (SP)
33.9	2450	0	1	1504	SAND, similar to above except 20% weak calcareous cement (starts 31.2), white, no odor (SP)
43.9	2440	0	1	1514	SAND, similar to above (SP)
53.9	2430	0	1	1525	SAND, similar to above except 10% weak calcareous (SP)
63.9	2420	0	1	1534	SAND, similar to above except 30% weak calcareous cement (SP) (base of calcareous cement at 65)
73.9	2410	0	1	1544	SAND, uniform fine grain, loose, red, dry, no odor (SP)
83.9	2400	0	1	1556	SAND, similar to above (SP)
93.9	2390	2.1	1	1611	SAND, similar to above except satrurated, moderate odor (SP)

FINA OIL AND CHEMICAL COMPANY
Big Spring, Texas

SITE E INVESTIGATION

Boring No.: E-12
Ground Level Elevation: 2482.3 feet mean sea level
Date: November 9, 1989
Discoloration: NONE
Odor: NONE
Top Of Saturation: 89.3 feet

Depth (feet)	Depth (msl)	HNU (reading)	HNU (scale)	Time	Description
2.3	2480	0	1	1234	FILL (SAND), uniform fine grain, loose to compact, red dry, no odor (F) (Base of Fill at 11.1)
12.3	2470	0	1	1238	SAND, uniform very fine grain compact, red, damp, no odor (SP)
22.3	2460	0	1	1245	SAND, uniform fine grain, loose, red, dry, no odor (SP)
32.3	2450	0	1	1250	SAND, similar to above (SP)
42.3	2440	0	1	1307	SAND, similar to above (SP)
52.3	2430	0	1	1315	SAND, similar to above (SP)
62.3	2420	0	1	1321	SAND, similar to above (SP)
72.3	2410	0	1	1341	SAND, similar to above (SP)
82.3	2400	0	1	1352	SAND, similar to above (SP)
92.3	2390	1.4	1	1400	SAND, similar to above except saturated, moderate odor (SP)

FINA OIL AND CHEMICAL COMPANY
Big Spring, Texas

SITE E INVESTIGATION

Boring No.: E-13
Ground Level Elevation: 2472.0 feet mean sea level
Date: November 8, 1989
Discoloration: NONE
Odor: NONE
Top Of Saturation: 80.4 feet

Depth (feet)	Depth (msl)	HNU (reading)	HNU (scale)	Time	Description
2.0	2470	0	1	1649	SAND, uniform very fine grain, <5% silt in matrix, compact, dry, red, no odor (SP)
12.0	2460	0	1	1651	SAND, uniform fine grain, loose, red dry, no odor (SP)
22.0	2450	0	1	1656	SAND, similar to above (SP)
32.0	2440	0	1	1700	SAND, similar to above (SP)
42.0	2430	0	1	1706	SAND, similar to above except 10% weak calcareous cement (SP)
52.0	2420	0	1	1712	SAND, similar to above (SP)
62.0	2410	0	1	1720	SAND, similar to above except no calcareous cement (SP)
72.0	2400	0	1	1729	SAND, similar to above (SP)
82.0	2390	0.5	1	1739	SAND, similar to above except saturated, slight odor (SP)

FINA OIL AND CHEMICAL COMPANY
Big Spring, Texas

SITE E INVESTIGATION

Boring No.: E-14
Ground Level Elevation: 2475.8 feet mean sea level
Date: November 8, 1989
Discoloration: 0 to 7 feet (black), 7 to 9 feet (black streaks), 9 to 15 feet (black spots)
Odor: 0 to 47 feet
Top Of Saturation: 84.9 feet

Depth (feet)	Depth (msl)	HNU (reading)	HNU (scale)	Time	Description
5.8	2470	6.0	1	1050	SAND, uniform fine grain, compact, dry, black, moderate odor (SP)
15.8	2460	5.7	1	1100	SAND, uniform fine grain, loose, dry, red with black spots, moderated odor (SP)
25.8	2450	0	1	1133	SAND, similar to above except no discoloration, very slight odor (SP)
35.8	2440	0	1	1140	SAND, similar to above (SP)
45.8	2430	0	1	1154	SAND, similar to above (SP)
55.8	2420	0	1	1203	SAND, uniform fine grain, compact, 15% calcareous cement, pink, dry, no odor (SP)
65.8	2410	0	1	1214	SAND, similar to above except 5% calcareous cement (SP)
75.8	2400	0	1	1223	SAND, similar to above (SP)
85.8	2390	3.1	1	1236	SAND, similar to above except saturated, moderate odor (SP)

FINA OIL AND CHEMICAL COMPANY
Big Spring, Texas

SITE E INVESTIGATION

Boring No.: E-15
Ground Level Elevation: 2481.4 feet mean sea level
Date: November 7, 1989
Discoloration: 0 to 10.5 feet (black)
Odor: 0 to 34 feet
Top Of Saturation: 83.4 feet

Depth (feet)	Depth (msl)	HNU (reading)	HNU (scale)	Time	Description
1.4	2480	1.8	10	1338	SILTY SAND, poorly graded, unifrom fine sand, 20% silt, cohesive, damp with oil (SM)
11.4	2470	1.8	10	1345	SAND, uniform fine sand, loose, red, dry, strong odor (SP)
21.4	2460	1.7	10	1409	SAND, similar to above, strong odor (SP)
31.4	2450	9.0	1	1415	SAND, similar to above, strong odor (SP) 35 to 40 feet: SANDSTONE, dense, unweathered, 40% calcareous cement (Ss)
41.4	2440	0	1	1424	SAND, similar to above except 20% moderate calcareous cement (40 to 48 feet) (SP)
51.4	2430	0	1	1456	SAND, similar to above except no calcareous cement (SP)
61.4	2420	0	1	1513	SAND, similar to above (SP)
71.4	2410	0	1	1528	SAND, similar to above (SP)
81.4	2400	3.1	1	1541	SAND, similar to above except damp, moderate odor (SP)
91.4	2390	2.6	1	1558	SAND, similar to above except saturated (SP)

FINA OIL AND CHEMICAL COMPANY
Big Spring, Texas

SITE E INVESTIGATION

Boring No.: E-16
Ground Level Elevation: 2483.8 feet mean sea level
Date: November 7-8, 1989
Discoloration: 0 to 11 feet (black), 11 to 36 feet (black spots)
Odor: 0 to 56 feet
Top Of Saturation: 88.2 feet

Depth (feet)	Depth (msl)	HNU (reading)	HNU (scale)	Time	Description
3.8	2480	3.0	10	1650	SILTY SAND, poorly graded, 25% silt, cohensive to dense, moist with oil, strong odor (SM)
13.8	2470	10.4	1	1657	SAND, uniform fine grain, loose, red, dry, strong odor (SP)
23.8	2460	0.1	1	0814	SAND, similar to above except spots of oil, red, loose, dry, moderate odor (SP)
33.8	2450	0.2	1	0820	SAND, similar to above, spots of oil (SP)
43.8	2440	0	1	0831	SAND, uniform fine sand, compact, 10% weak calcareous cement, pink, dry, slight odor (SP)
53.8	2430	0	1	0840	SAND, similar to above except 20% calcareous cement, very slight odor (SP) (top of sandstone: 58.4 feet)
63.8	2420	0	1	0854	SANDSTONE, dense, unweathered, 40% calcareous cement (well cemented) white, no odor (Ss) (base of sandstone: 67.5 feet)
73.8	2410	0	1	0904	SAND, uniform fine sand, loose, red, dry, no odor (SP)
83.8	2400	0	1	0925	SAND, similar to above (SP)
93.8	2390	2.3	1	0942	SAND, similar to above except saturated, moderate odor (SP)

FINA OIL AND CHEMICAL COMPANY
Big Spring, Texas

SITE E INVESTIGATION

Boring No.: E-17
Ground Level Elevation: 2488.4 feet mean sea level
Date: November 6, 1989
Discoloration: 0 to 14 feet (black)
Odor: 0 to 32 feet
Top Of Saturation: 93.6 feet

Depth (feet)	Depth (msl)	HNU (reading)	HNU (scale)	Time	Description
8.4	2480	2.3	10	1049	SILTY SAND, poorly graded very fine sand, 10%-15% silt in matrix, cohesive, black, damp with oil, very strong odor (SM)
18.4	2470	2.1	10	1111	SAND, poorly graded, uniform fine sand, loose, red, strong odor, dry (SP)
28.4	2460	1.9	1	1327	SAND, similar to above except slight odor (SP)
38.4	2450	0	1	1342	SAND, similar to above except minor calcareous (36 to 43 feet), no odor (SP)
48.4	2440	0	1	1354	SAND, similar to above (SP)
58.4	2430	0	1	1404	SAND, similar to above (SP)
68.4	2420	0	1	1422	SAND, similar to above except 10% weak calcareous cement (SP)
78.4	2410	0	1	1508	SAND, similar to above (SP)
88.4	2400	0	1	1527	SAND, similar to above (SP)
98.4	2390	0.4	1	1550	SAND, similar to above except saturated, moderate odor (SP)

FINA OIL AND CHEMICAL COMPANY
Big Spring, Texas

SITE E INVESTIGATION

Boring No.: E-18
Ground Level Elevation: 2481.6 feet mean sea level
Date: November 7, 1989
Discoloration: 0 to 10 feet (black)
Odor: 0 to 50 feet
Top Of Saturation: 86.7 feet

Depth (feet)	Depth (msl)	HNU (reading)	HNU (scale)	Time	Description
1.6	2480	2.2	10	1004	SILTY SAND, uniform fine sand, 30% silt in matrix, cohesive, black, moist with oil (SM)
11.6	2470	2.3	1	1020	SAND, uniform fine sand, loose, red, dry, moderate odor (SP)
21.6	2460	0.3	1	1042	SAND, similar to above except slight odor (SP)
31.6	2450	0	1	1048	SAND, similar to above except very slight odor (SP) 35.3 to 40 feet: SANDSTONE, dense, unweathered, 40% calcareous cement (well cemented) (Ss)
41.6	2440	0	1	1100	SAND, uniform fine sand, loose, red, dry, very slight odor (SP)
51.6	2430	0	1	1107	SAND, similar to above except no odor (SP)
61.6	2420	0	1	1120	SAND, similar to above except 5% weak calcareous cement (SP)
71.6	2410	0	1	1132	SAND, similar to above (SP)
81.6	2400	0	1	1144	SAND, similar to above (SP)
91.6	2390	0	1	1200	SAND, similar to above except saturated, moderate odor (SP)

FINA OIL AND CHEMICAL COMPANY
Big Spring, Texas

SITE E INVESTIGATION

Boring No.: E-19
Ground Level Elevation: 2485.1 feet mean sea level
Date: November 7, 1989
Discoloration: 0 to 13.6 feet (black)
Odor: 0 to 21.3 feet
Top Of Saturation: 90.4 feet

Depth (feet)	Depth (msl)	HNU (reading)	HNU (scale)	Time	Description
5.1	2480	2.3	10	0721	SILTY SAND, poorly graded, 30% silt, very fine sand, cohesive, moist with oil, black, very strong odor (SM)
15.1	2470	1.0	1	0729	SAND, uniform very fine to fine, loose, red, dry, very slight odor (SP)
25.1	2460	0.1	1	0758	SAND, similar to above except minor calcareous nodules, no odor (SP)
35.1	2450	0	1	0804	SAND, similar to above except no calcareous nodules (SP)
45.1	2440	0	1	0812	SAND, similar to above (SP)
55.1	2430	0	1	0821	SAND, similar to above (SP)
65.1	2420	0	1	0835	SAND, similar to above (SP)
75.1	2410	0	1	0850	SAND, similar to above (SP)
85.1	2400	0	1	0904	SAND, similar to above (SP)
95.1	2390	0.5	1	0919	SAND, similar to above except saturated, moderate odor (SP)

FINA OIL AND CHEMICAL COMPANY
Big Spring, Texas

SITE E INVESTIGATION

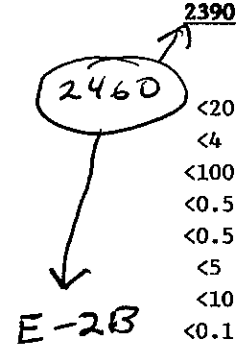
Boring No.: E-20
Ground Level Elevation: 2482.2 feet mean sea level
Date: November 9, 1989
Discoloration: NONE
Odor: NONE
Top Of Saturation: 89.0 feet

Depth (feet)	Depth (msl)	HNU (reading)	HNU (scale)	Time	Description
2.2	2480	0	1	0924	SAND, uniform fine sand loose, red, dry, no odor (SP)
12.2	2470	0	1	0927	SAND, similar to above (SP)
22.2	2460	0	1	0932	SAND, similar to above (SP)
32.2	2450	0	1	0940	SAND, similar to above (SP)
42.2	2440	0	1	0946	SAND, similar to above (SP)
52.2	2430	0	1	0957	SAND, similar to above (SP)
62.2	2420	0	1	1011	SAND, similar to above (SP)
72.2	2410	0	1	1021	SAND, similar to above (SP)
82.2	2400	0	1	1035	SAND, similar to above (SP)
92.2	2390	2.0	1	1053	SAND, similar to above except saturated, moderate odor (SP)

ANALYTICAL RESULTS - SITE E
FINA OIL AND CHEMICAL COMPANY
BORING E-2A

Elevation	2430	2420	2410	2400	2390
Metals					
Antimony	<20	<20	<20	<20	<20
Arsenic	<4	<4	<4	<4	<4
Barium	<100	<100	<100	<100	<100
Beryllium	<0.5	<0.5	<0.5	<0.5	<0.5
Cadmium	<0.5	<0.5	<0.5	<0.5	<0.5
Chromium	<5	<5	<5	<5	<5
Lead	<10	<10	<10	<10	<10
Mercury	**0.3**	<0.1	**0.9**	<0.1	<0.1
Nickel	<4	<4	<4	<4	<4
Semivolatiles					
Naphthalene	<0.5	<0.5	<0.5	<0.5	<0.5
Phenanthrene	<0.5	<0.5	<0.5	<0.5	<0.5
Pyrene	<0.5	<0.5	<0.5	<0.5	<0.5
1-Methyl naphthalene	ND	ND	ND	ND	ND
Di-n-butylphthalate	<0.5	<0.5	<0.5	<0.5	<0.5
Anthracene	<0.5	<0.5	<0.5	<0.5	<0.5
Cresols	<0.5	<0.5	<0.5	<0.5	<0.5
Styrene	<1.0	<1.0	<1.0	<1.0	<1.0
Phenol	<0.5	<0.5	<0.5	<0.5	<0.5
Bis(2-ethylhexyl)phthalate	<0.5	<0.5	<0.5	<0.5	<0.5
Volatiles					
Ethyl Benzene	<0.2	<0.2	<0.2	<0.2	**2.1**
Xylene	<1.0	<1.0	<1.0	<1.0	**8.1**
Benzene	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	<0.2	<0.2	<0.2	<0.2	**0.2**

ND = Not Detected



JONES & NEUSE

ANALYTICAL RESULTS - SITE E
FINA OIL AND CHEMICAL COMPANY
BORING E-2B

Elevation	2450	2440	2430	2420	2410	2400
Metals						
Antimony	<20	<20	<20	<20	<20	<20
Arsenic	<4	<4	<4	<4	<4	<4
Barium	<100	<100	<100	<100	<100	<100
Beryllium	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Cadmium	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chromium	<5	<5	<5	<5	<5	<5
Lead	<10	<10	<10	<10	<10	<10
Mercury	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	<4	<4	<4	<4	<4	<4
Semivolatiles						
Naphthalene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Phenanthrene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Pyrene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1-Methyl naphthalene	ND	ND	ND	ND	ND	ND
Di-n-butylphthalate	<0.5	<0.5	**6.4**	<0.5	<0.5	<0.5
Anthracene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Cresols	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Styrene	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Phenol	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bis(2-ethylhexyl)phthalate	<0.5	<0.5	**0.8**	<0.5	<0.5	<0.5
Volatiles						
Ethyl Benzene	**0.9**	**0.3**	<0.2	<0.2	<0.2	<0.2
Xylene	**5.1**	**2.0**	<1.0	<1.0	<1.0	<1.0
Benzene	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2

ND = Not Detected

JONES & NEUSE

ANALYTICAL RESULTS - SITE E
FINA OIL AND CHEMICAL COMPANY
BORING E-11

Elevation	2480	2470	2460	2450	2440	2430	2420	2410	2400	2390
Metals										
Antimony	<20	<20	<20	**43**	<20	<20	<20	<20	<20	<20
Arsenic	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4
Barium	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
Beryllium	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Cadmium	<0.5	<0.5	**0.6**	**2.6**	**0.6**	**0.7**	<0.5	<0.5	<0.5	<0.5
Chromium	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Lead	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Mercury	**1.1**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**0.1**	**0.2**
Nickel	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4
Semivolatiles										
Naphthalene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Phenanthrene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Pyrene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1-Methyl naphthalene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Di-n-butylphthalate	<0.5	<0.5	<0.5	<0.5	**0.7**	<0.5	**3.8**	**1.3**	<0.5	<0.5
Anthracene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Cresols	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**3.3**
Styrene	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Phenol	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**2.8**
Bis(2-ethylhexyl)phthalate	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Volatiles										
Ethyl Benzene	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Xylene	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Benzene	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2

ND = Not Detected

JONES & NEUSE

ANALYTICAL RESULTS - SITE E
FINA OIL AND CHEMICAL COMPANY
BORING E-10

Elevation	2480	2470	2460	2450	2440	2430	2420	2410	2400	2390
Metals										
Antimony	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
Arsenic	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4
Barium	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
Beryllium	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Cadmium	<0.5	<0.5	<0.5	<0.5	**0.7**	<0.5	<0.5	<0.5	<0.5	<0.5
Chromium	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Lead	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Mercury	<0.1	**0.1**	<0.1	<0.1	**0.1**	<0.1	<0.1	**0.1**	**0.1**	**0.1**
Nickel	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4
Semivolatiles										
Naphthalene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Phenanthrene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Pyrene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1-Methyl naphthalene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Di-n-butylphthalate	<0.5	<0.5	**1.3**	<0.5	<0.5	**3.8**	<0.5	**1.1**	**0.6**	**1.1**
Anthracene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Cresols	**0.5**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**1.8**
Styrene	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Phenol	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bis(2-ethylhexyl)phthalate	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Volatiles										
Ethyl Benzene	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Xylene	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Benzene	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2

ND = Not Detected

JONES & NEUSE

ANALYTICAL RESULTS - SITE E
FINA OIL AND CHEMICAL COMPANY
BORING E-13

Elevation	2470	2460	2450	2440	2430	2420	2410	2400	2390
Metals									
Antimony	<20	<20	<20	<20	<20	<20	<20	<20	<20
Arsenic	<4	<4	<4	<4	<4	<4	<4	<4	<4
Barium	<100	<100	<100	<100	<100	<100	<100	<100	<100
Beryllium	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**0.6**	**0.8**
Cadmium	**1.0**	**0.9**	**0.6**	<0.5	**1.4**	**1.3**	**1.0**	**0.5**	<0.5
Chromium	<5	<5	<5	<5	<5	<5	<5	<5	<5
Lead	**52**	<10	<10	<10	<10	<10	<10	<10	<10
Mercury	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	<4	<4	<4	<4	<4	<4	<4	<4	<4
Semivolatiles									
Naphthalene	<2	<0.7	<0.7	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Phenanthrene	<2	<0.7	<0.7	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Pyrene	<2	<0.7	<0.7	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1-Methyl naphthalene	ND	ND	ND	ND	ND	ND	ND	ND	ND
Di-n-butylphthalate	<2	**0.7**	<0.7	<0.5	<0.5	<0.5	<0.5	<0.5	**0.9**
Anthracene	<2	<0.7	<0.7	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Cresols	<2	<0.7	<0.7	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Styrene	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Phenol	<2	<0.7	<0.7	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bis(2-ethylhexyl)phthalate	<2	<0.7	<0.7	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Volatiles									
Ethyl Benzene	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Xylene	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Benzene	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2

ND = Not Detected

JONES & NEUSE

ANALYTICAL RESULTS - SITE E
FINA OIL AND CHEMICAL COMPANY
BORING E-14

Elevation	2470	2460	2450	2440	2430	2420	2410	2400	2390
Metals									
Antimony	<20	<20	<20	<20	<20	<20	<20	<20	<20
Arsenic	<4	<4	<4	<4	<4	<4	<4	<4	<4
Barium	<100	<100	**180**	<100	<100	<100	<100	<100	<100
Beryllium	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Cadmium	<0.5	<0.5	<0.5	**0.6**	**0.7**	**0.8**	**1.2**	**1.3**	**0.9**
Chromium	<5	<5	<5	<5	<5	<5	<5	<5	<5
Lead	<10	<10	<10	<10	<10	<10	<10	<10	<10
Mercury	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	<4	<4	<4	<4	<4	<4	<4	<4	<4
Semivolatiles									
Naphthalene	<0.7	<0.7	<0.7	<0.7	**4.0**	<0.5	<0.5	<0.7	<0.7
Phenanthrene	**0.7**	<0.7	<0.7	<0.7	**4.9**	<0.5	<0.5	<0.7	<0.7
Pyrene	<0.7	<0.7	<0.7	<0.7	<0.5	<0.5	<0.5	<0.7	<0.7
1-Methyl naphthalene	ND	ND	ND	ND	ND	ND	ND	ND	ND
Di-n-butylphthalate	**2.1**	<0.7	<0.7	<0.7	<0.5	**0.5**	<0.5	<0.7	**2.5**
Anthracene	<0.7	<0.7	<0.7	<0.7	<0.5	<0.5	<0.5	<0.7	<0.7
Cresols	<0.7	<0.7	<0.7	<0.7	<0.5	<0.5	<0.5	<0.7	**1.1**
Styrene	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Phenol	<0.7	<0.7	<0.7	<0.7	<0.5	<0.5	<0.5	<0.7	**1.1**
Bis(2-ethylhexyl)phthalate	<0.7	<0.7	<0.7	<0.7	<0.5	<0.5	<0.5	<0.7	<0.7
Volatiles									
Ethyl Benzene	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Xylene	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Benzene	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2

ND = Not Detected

JONES & NEUSE

ANALYTICAL RESULTS - SITE E
FINA OIL AND CHEMICAL COMPANY
BORING E-15

Elevation	2480	2470	2460	2450	2440	2430	2420	2410	2400	2390
Metals										
Antimony	<20	<20	<20	<20	**48**	<20	<20	<20	**25**	<20
Arsenic	**5**	<4	<4	<4	<4	<4	<4	<4	<4	<4
Barium	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
Beryllium	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Cadmium	**1.2**	<0.5	<0.5	<0.5	**1.6**	**0.7**	**1.3**	<0.5	**0.9**	**1.3**
Chromium	**286**	<5	<5	<5	<5	<5	<5	<5	<5	<5
Lead	**269**	<10	<10	<10	<10	<10	<10	<10	<10	<10
Mercury	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4
Semivolatiles										
Naphthalene	<50	**2.9**	**4.1**	**11.9**	**6.2**	**5.8**	<0.7	<0.7	<0.7	<0.7
Phenanthrene	<50	**4.3**	**5.0**	**9.3**	**5.9**	**5.7**	<0.7	<0.7	**1.2**	<0.7
Pyrene	<50	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7
1-Methyl naphthalene	ND	**7.3***	**9.2***	ND	**8.3***	**7.9***	ND	ND	**1.4***	ND
Di-n-butylphthalate	<50	<0.7	<0.7	<0.7	<0.7	**1.0**	**1.2**	<0.7	<0.7	**9.4**
Anthracene	<50	<0.7	<0.7	<0.7	**0.7**	**0.7**	<0.7	<0.7	<0.7	<0.7
Cresols	<50	<0.7	<0.7	<0.7	**0.8**	<0.7	<0.7	<0.7	<0.7	**1.2**
Styrene	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Phenol	<50	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7
Bis(2-ethylhexyl)phthalate	<50	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7
Volatiles										
Ethyl Benzene	**17.1**	**1.2**	**1.2**	**1.4**	**0.7**	**0.5**	<0.2	<0.2	<0.2	<0.2
Xylene	**3.9**	**3.2**	**4.2**	**4.9**	**3.0**	**2.0**	<1.0	<1.0	<1.0	<1.0
Benzene	**0.6**	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	**0.9**	<0.2	<0.2	**0.4**	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2

ND = Not Detected
*** = Value based upon an assumed response factor of 1**

JONES & NEUSE

ANALYTICAL RESULTS - SITE E
FINA OIL AND CHEMICAL COMPANY
BORING E-16

Elevation	2480	2470	2460	2450	2440	2430	2420	2410	2400	2390
Metals										
Antimony	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
Arsenic	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4
Barium	<100	<100	<100	<100	<100	<100	<100	**188**	<100	<100
Beryllium	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Cadmium	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**1.7**	<0.5	**0.8**	**0.9**
Chromium	**130**	<5	<5	<5	<5	<5	<5	<5	<5	<5
Lead	**125**	<10	<10	<10	<10	<10	<10	<10	<10	<10
Mercury	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	**5**	<4	<4	<4	<4	<4	<4	<4	<4	<4
Semivolatiles										
Naphthalene	<118	<7	**11**	<7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7
Phenanthrene	<118	**15**	**38**	**18**	**2.9**	<0.7	<0.7	<0.7	<0.7	<0.7
Pyrene	<118	<7	<7	<7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7
1-Methyl naphthalene	ND	ND	**55***	ND	**3.1***	ND	ND	ND	ND	ND
Di-n-butylphthalate	<118	<7	<7	**9.8**	<0.7	**0.8**	**0.8**	<0.7	<0.7	**0.9**
Anthracene	<118	<7	<7	<7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7
Cresols	<118	<7	<7	<7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7
Styrene	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Phenol	<118	<7	<7	<7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7
Bis(2-ethylhexyl)phthalate	<118	<7	<7	<7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7
Volatiles										
Ethyl Benzene	**33.7**	**0.4**	**1.3**	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Xylene	**6.2**	<1.0	**4.3**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Benzene	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	<0.2	<0.2	**0.3**	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2

ND = Not Detected

*** = Values based upon an assumed response factor of 1**

JONES & NEUSE

ANALYTICAL RESULTS - SITE E
FINA OIL AND CHEMICAL COMPANY
BORING E-17

Elevation	2480	2470	2460	2450	2440	2430	2420	2410	2400	2390
Metals										
Antimony	**62**	<20	<20	<20	<20	<20	**50**	**32**	<20	**40**
Arsenic	**6**	<4	<4	<4	<4	<4	<4	<4	<4	<4
Barium	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
Beryllium	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Cadmium	**3**	<0.5	<0.5	<0.5	<0.5	**0.8**	**1.8**	**1.2**	**1.4**	**1.9**
Chromium	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Lead	**585**	<10	<10	<10	<10	<10	<10	<10	<10	<10
Mercury	<0.1	**0.8**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	**16**	<4	<4	<4	<4	<4	<4	<4	<4	<4
Semivolatiles										
Naphthalene	**48**	**6.2**	<0.6	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7
Phenanthrene	**60**	**6.5**	<0.6	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7
Pyrene	<16	**1.8**	<0.6	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7
1-Methyl naphthalene	**128***	**15.0***	ND	ND	ND	ND	ND	ND	ND	ND
Di-n-butylphthalate	<16	<1.4	<0.6	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	**1.0**
Anthracene	<16	<1.4	<0.6	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7
Cresols	<16	<1.4	<0.6	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7
Styrene	<1.0	**1.6**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Phenol	<16	<1.4	<0.6	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7
Bis(2-ethylhexyl)phthalate	<16	<1.4	<0.6	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7
Volatiles										
Ethyl Benzene	**27.6**	**4.0**	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Xylene	**67.0**	**7.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Benzene	**8.1**	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	**17.9**	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2

ND = Not Detected
*** = Value based upon an assumed response factor of 1**

JONES & NEUSE

ANALYTICAL RESULTS - SITE E
FINA OIL AND CHEMICAL COMPANY
BORING E-18

Elevation	2480	2470	2460	2450	2440	2430	2420	2410	2400	2390
Metals										
Antimony	<20	<20	<20	<20	<20	**29**	<20	<20	<20	<20
Arsenic	**4**	<4	<4	<4	<4	<4	<4	<4	<4	<4
Barium	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
Beryllium	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Cadmium	**1.0**	<0.5	<0.5	<0.5	**1.2**	**0.9**	**1.2**	**0.5**	<0.5	<0.5
Chromium	**127**	<5	<5	<5	<5	<5	<5	<5	<5	<5
Lead	**292**	<10	<10	<10	<10	<10	<10	<10	<10	<10
Mercury	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	**10**	<4	<4	<4	<4	<4	<4	<4	<4	<4
Semivolatiles										
Naphthalene	<100	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7
Phenanthrene	<100	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7
Pyrene	<100	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7
1-Methyl naphthalene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Di-n-butylphthalate	<100	<0.7	<0.7	<0.7	**6.3**	**0.7**	<0.7	**1.4**	<0.7	**1.8**
Anthracene	<100	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7
Cresols	<100	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	**2.3**
Styrene	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Phenol	<100	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7
Bis(2-ethylhexyl)phthalate	<100	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7
Volatiles										
Ethyl Benzene	**1.0**	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Xylene	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Benzene	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2

ND = Not Detected

JONES & NEUSE

ANALYTICAL RESULTS - SITE E
FINA OIL AND CHEMICAL COMPANY
BORING E-19

Elevation	2480	2470	2460	2450	2440	2430	2420	2410	2400	2390
Metals										
Antimony	**47**	<20	**37**	**39**	<20	<20	**51**	<20	<20	<20
Arsenic	**8**	<4	<4	<4	<4	<4	<4	<4	<4	<4
Barium	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
Beryllium	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Cadmium	**2.6**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chromium	**154**	<5	<5	<5	<5	<5	<5	<5	<5	<5
Lead	**418**	<10	<10	<10	<10	<10	<10	<10	<10	<10
Mercury	**0.4**	**0.2**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	**27**	<4	<4	<4	<4	<4	<4	<4	<4	<4
Semivolatiles										
Naphthalene	<33	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<1
Phenanthrene	**34**	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<1
Pyrene	<33	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<1
1-Methyl naphthalene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Di-n-butylphthalate	<33	<0.7	<0.7	**1.1**	<0.7	**1.7**	<0.7	<0.7	**0.8**	**6**
Anthracene	<33	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<1
Cresols	<33	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<1
Styrene	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Phenol	<33	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<1
Bis(2-ethylhexyl)phthalate	<33	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<1
Volatiles										
Ethyl Benzene	**8.6**	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Xylene	**8.3**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Benzene	**6.8**	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	**3.3**	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2

ND = Not Detected

JONES & NEUSE

ANALYTICAL RESULTS - SITE E
FINA OIL AND CHEMICAL COMPANY
BORING E-20

Elevation	2480	2470	2460	2450	2440	2430	2420	2410	2400	2390
Metals										
Antimony	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
Arsenic	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4
Barium	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
Beryllium	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Cadmium	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**0.8**	**0.5**	<0.5	**0.6**
Chromium	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Lead	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Mercury	**0.2**	<0.1	**0.4**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	<0.1
Nickel	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4
Semivolatiles										
Naphthalene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0
Phenanthrene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0
Pyrene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0
1-Methyl naphthalene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Di-n-butylphthalate	<0.5	<0.5	<0.5	<0.5	**1.0**	**0.8**	**1.2**	**1.1**	**2.0**	**17.3**
Anthracene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0
Cresols	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0
Styrene	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Phenol	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0
Bis(2-ethylhexyl)phthalate	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0
Volatiles										
Ethyl Benzene	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Xylene	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Benzene	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2

ND = Not Detected

JONES & NEUSE

Monitor Well Installation

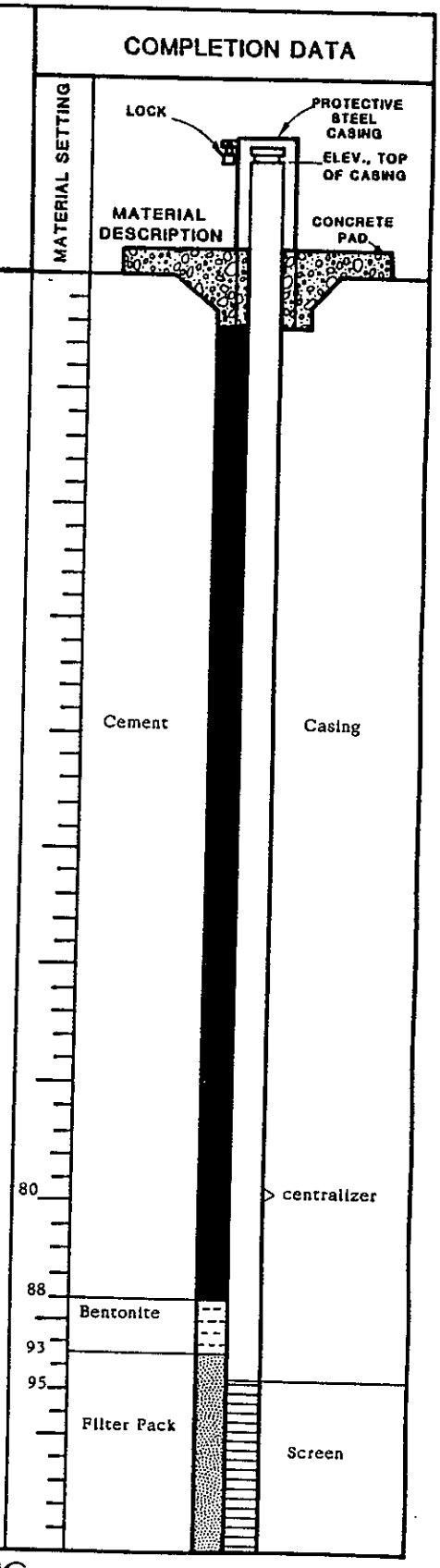
CLIENT: Fina Oil and Chemical Company JOB NO.: 119505 DATE DRILLED: 9-17-87 WELL NO.: MW-38

SITE: Big Spring, Texas ELEVATION: PAD 2497.45 TOP OF PVC CASING 2500.28

TOTAL DEPTH: 117.7' TOC CASING SIZE & TYPE: 2" PVC Flush Threaded SCREEN SIZE: 0.020 mill slot

WATER LEVEL: 100.21' REF.: TOC DATE: 10-1-87 TIME: 1417 Hrs. GEOLOGIST: Robert Sherrill

DEPTH	N. VALUE (BLOW/FT)	POCKET PENETROMETER (TONS/FT²)	SYMBOL	STRATIGRAPHY	SAMPLE DESCRIPTION
			SP		SAND - uniform fine grain, loose, grey, damp
10			SP		SAND - similar to above
20			SP		SAND - uniform fine grain, loose, red, dry
30			SP		SAND - similar to above except some minor gravel, calcareous
40			SP		SAND - similar to above except no gravel
50			SP		SAND - similar to above except 2% fine calcareous gravel
60			SP		SAND - similar to above
70			SP		SAND - similar to above
80			SP		SAND - similar to above except no gravel
90			SP		SAND - similar to above
					▼ Top of saturation 96' below grade
100			SP		SAND - similar to above except saturated



JONES AND NEUSE, INC.
Engineering and Environmental Consultants

Monitor Well Installation

CLIENT: Fina Oil and Chemical Company JOB NO.: 119505 DATE DRILLED: 9-17-87 WELL NO.: MW-38

SITE: Big Spring, Texas ELEVATION: PAD 2497.45 TOP OF PVC CASING 2500.28

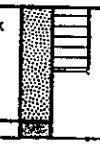
TOTAL DEPTH: 117.7' TOC CASING SIZE & TYPE: 2" PVC Flush Threaded SCREEN SIZE: 0.020 mill slot

WATER LEVEL: 100.21' REF.: TOC DATE: 10/1/87 TIME: 1417 hours GEOLOGIST: Robert Sherrill

DEPTH	N. VALUE (BLOW/FT)	POCKET PENETROMETER (TONS/FT²)	SYMBOL	STRATIGRAPHY	SAMPLE DESCRIPTION
			GP		SANDY GRAVEL - fine to very fine calcareous and chert gravel, subrounded,30% fine sand,loose,grey,saturated
120			GP		SANDY GRAVEL - similar to above except 45% sand
					Boring Terminated at 120' feet below grade

COMPLETION DATA

MATERIAL SETTING	MATERIAL DESCRIPTION CONT'D.
115	Filter Pack
119	Screen
120	Collapse



JONES AND NEUSE, INC. CONSULTING ENGINEERS' AUSTIN, TEXAS

Monitor Well Installation

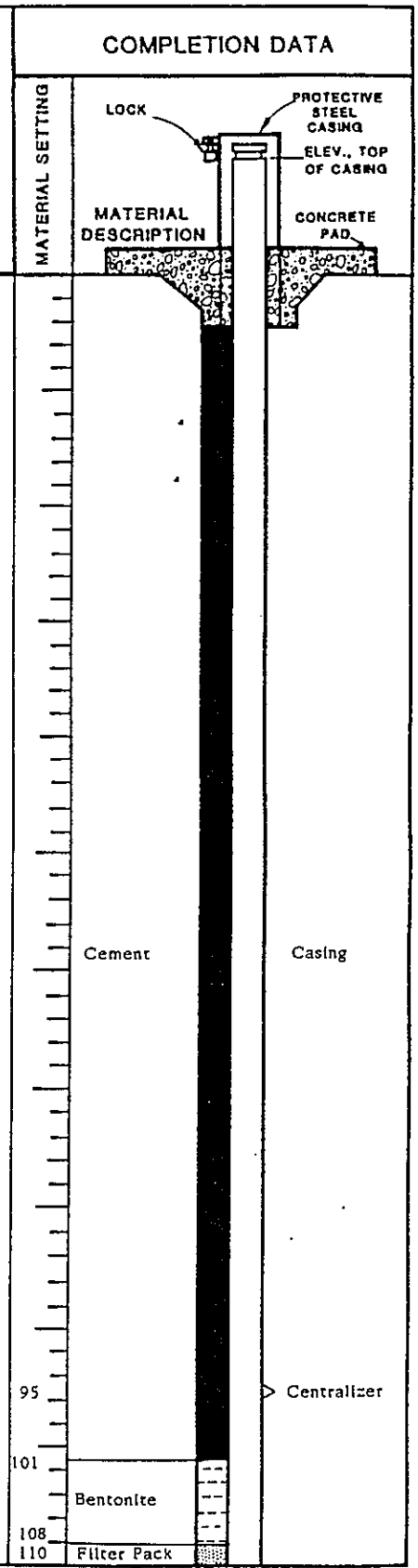
CLIENT: Fina Oil and Chemical Company JOB NO.: 119505 DATE DRILLED: 9-16-87 WELL NO.: MW-38A

SITE: Big Spring, Texas ELEVATION: PAD 2497.58 TOP OF PVC CASING 2500.25

TOTAL DEPTH: 147.77' TOC CASING SIZE & TYPE: 2" PVC Flush Threaded SCREEN SIZE: 0.020 mill slot

WATER LEVEL: 100.29' REF.: TOC DATE: 10-1-87 TIME: 1421 hrs. GEOLOGIST: Robert Sherrill

DEPTH	N. VALUE (BLOW/FT)	POCKET PENETROMETER (TONS/FT²)	SYMBOL	STRATIGRAPHY	SAMPLE DESCRIPTION
			SP		SAND - uniform fine grain, loose, black, saturated.
10			SP		SAND - similar to above
20			SP		SAND - uniform fine grain, loose, grey, damp
30			SP		SAND - similar to above except red, some minor calcareous gravel, dry
40			SP		SAND - uniform fine, loose, red, dry
50			SP		SAND - similar to above except 2% fine calcareous gravel
60			SP		SAND - similar to above
70			SP		SAND - similar to above
80			SP		SAND - similar to above except no gravel
90			SP		SAND - similar to above
			▼		Top of saturation 96' feet below grade
100			SP		SAND - similar to above except saturated



JONES AND NEUSE, INC.
Engineering and Environmental

Monitor Well Installation

CLIENT: Fina Oil and Chemical Company JOB NO.: 119505 DATE DRILLED: 3-16-87 WELL NO.: MW-38A

SITE: Big Spring, Texas ELEVATION: PAD 2497.58 TOP OF PVC CASING 2500.25

TOTAL DEPTH: 147.77' TOC CASING SIZE & TYPE: 2" ID PVC Flush Threaded SCREEN SIZE: 0.020 mill slot

WATER LEVEL: 100.29 REF.: TOC DATE: 10/1/87 TIME: 1421 hrs. GEOLOGIST: Robert L. Sherrill

DEPTH	N. VALUE (BLOW/FT)	POCKET PENETROMETER (TONS/FT²)	SYMBOL	STRATIGRAPHY	SAMPLE DESCRIPTION
120			GP		SANDY GRAVEL - fine to very fine calcareous and chert gravel, subrounded, 30% fine sand, loose, grey, saturated
			GP		SANDY GRAVEL - similar to above except 45% sand
130			GP		SANDY GRAVEL - similar to above except 10% sand
140			GP		SANDY GRAVEL - similar to above
					Ogallala FM / Dockum Group
150			CH		CLAY - highly plastic, dense, red, dry
160			CH		CLAY - similar to above
					Boring Terminated at 160' feet below grade
170					
180					
190					
200					
210					

COMPLETION DATA

MATERIAL SETTING	MATERIAL DESCRIPTION CONT'D.
145	Filter Pack
146	Collapse
160	

Screen

JONES AND NEUSE, INC. CONSULTING ENGINEERS, AUSTIN, TEXAS

Monitor Well Installation

CLIENT: Fina Oil and Chemical Company JOB NO.: 119505 DATE DRILLED: 9-23-87 WELL NO.: MW-39

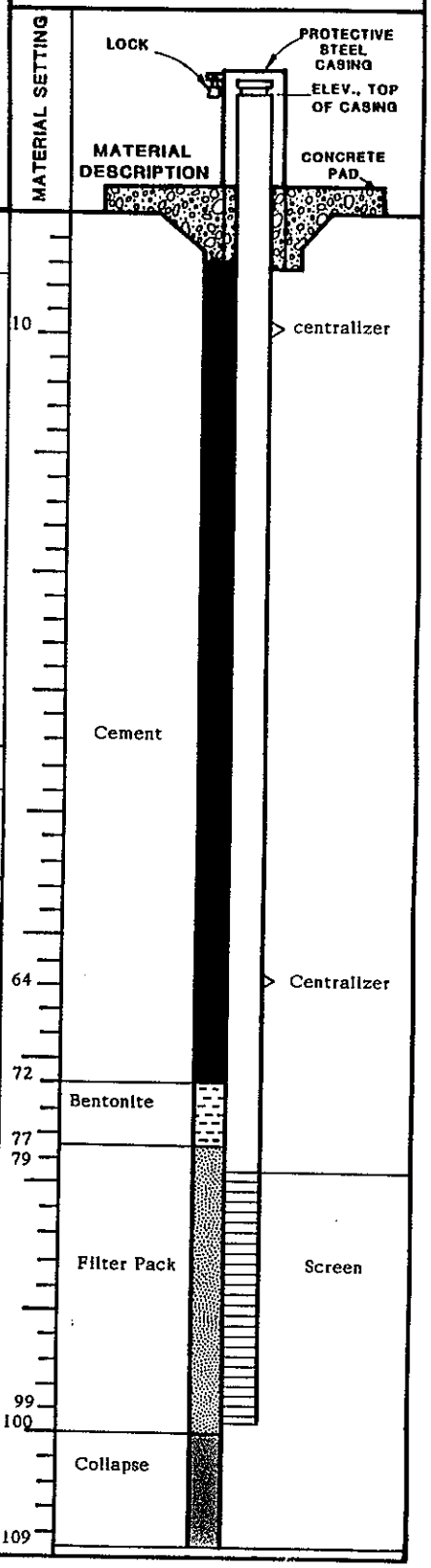
SITE: Big Spring, Texas ELEVATION: PAD 2482.59 TOP OF PVC CASING 2485.47

TOTAL DEPTH: 102.18' TOC CASING SIZE & TYPE: 2" PVC Flush Threaded SCREEN SIZE: 0.020 mill slot

WATER LEVEL: 87.32 REF.: TOC DATE: 10-1-87 TIME: 1430 hrs. GEOLOGIST: Robert L. Sherrill

DEPTH	N. VALUE (BLOW/FT)	POCKET PENETROMETER (TONS/FT²)	SYMBOL	STRATIGRAPHY	SAMPLE DESCRIPTION
					Asphalt
			F		Fill Material - SAND - uniform fine, loose, red, damp
10			SP		SAND - uniform fine grain, loose, red and grey, damp
20			SP		SAND - uniform fine grain, loose, red, dry, some minor very fine calcareous gravel
30			SP		SAND - uniform fine grain, loose, red, dry
40			SP		SAND - similar to above except some minor calcareous cement
			SS		SANDSTONE - uniform fine grain, dense, 40% calcareous cement, red, dry
50			SP		SAND - uniform fine grain, loose, red, dry
			SS		SANDSTONE - uniform fine grain, dense, 40% calcareous cement, red dry
60			SP		SAND - uniform fine grain, loose, red, dry
70			SP		SAND - similar to above
80			SP		▼ Top of Saturation 80 feet below grade SAND - uniform fine grain, <5% fine to medium calcareous and chert gravel, loose, red, saturated
90			SP		GRAVELLY SAND - uniform fine sand, 10% fine subrounded calcareous and chert gravel, loose, red, saturated
100			GP		GRAVEL - fine to medium chert and calcareous gravel, <5% fine sand, loose, red and grey, saturated
					BORING TERMINATED AT 109.0' BELOW GRADE

COMPLETION DATA



JONES AND NEUSE, INC.
Engineering and Environmental Consultants

Monitor Well Installation

CLIENT: Fina Oil and Chemical Company JOB NO.: 119505 DATE DRILLED: 9/22/87 WELL NO.: MW-39A

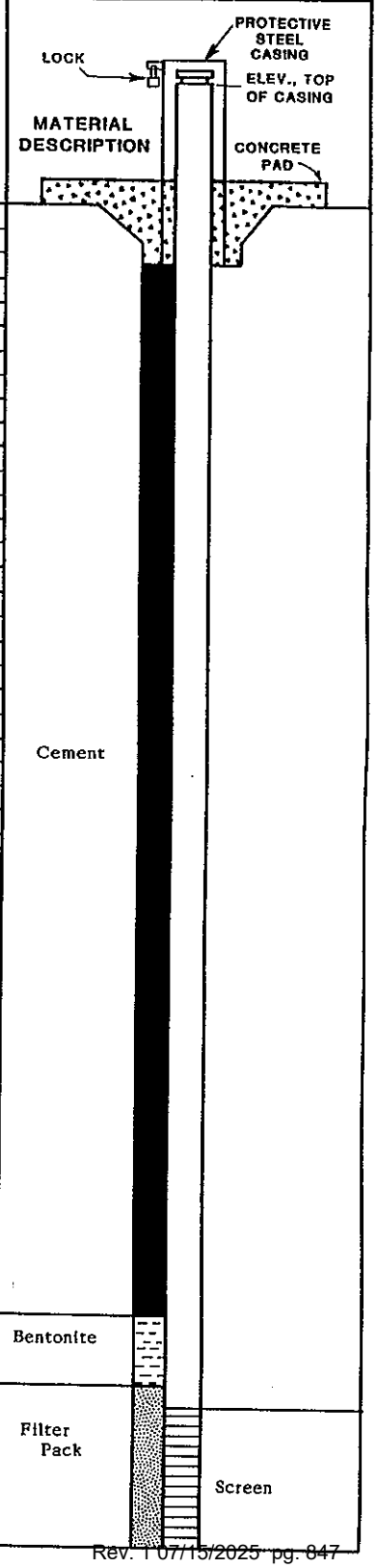
SITE: Big Spring, Texas ELEVATION: PAD 2482.88 TOP OF PVC CASING 2485.63

TOTAL DEPTH: 133.08' TOC CASING SIZE & TYPE: 2" ID PVC Flush Threaded SCREEN SIZE: 0.020 mill slot

WATER LEVEL: 87.50' REF.: TOC DATE: 10-1-87 TIME: 1434 hrs. GEOLOGIST: Robert L. Sherrill

DEPTH	N. VALUE (BLOW/FT)	POCKET PENETROMETER (TONS/FT²)	SYMBOL	STRATIGRAPHY	SAMPLE DESCRIPTION
			F		Asphalt FILL MATERIAL - SAND - uniform fine, loose, red, damp
10			SP		SAND - uniform fine grain, loose, red and grey, damp
20			SP		SAND - uniform fine grain, loose, red, dry, some minor very fine calcareous gravel
30			SP		SAND - uniform fine grain, loose, red, dry
40			SP		SAND - similar to above except some minor calcareous cement
			SS		SANDSTONE - uniform fine grain, dense, 40% calcareous cement, red, dry
50			SP		SAND - uniform fine grain, loose, red, dry
			SS		SANDSTONE - uniform fine grain, dense, 40% calcareous cement, red, dry
60			SP		SAND - uniform fine grain, loose, red, dry
70			SP		SAND - uniform fine grain, loose, red, dry
					Top of Saturation 80.0' below grade
80			SP		SAND - uniform fine grain, <5% fine to medium calcareous and chert gravel, loose, red, saturated
90			SP		GRAVELLY SAND - uniform fine sand, 10% fine subrounded calcareous and chert gravel, loose, red, saturated
100			GP		GRAVEL - fine to medium chert and clacareous gravel, <5% fine sand, loose, red and grey, saturated

COMPLETION DATA



JONES AND NEUSE, INC. CONSULTING ENGINEERS AUSTIN, TEXAS

Monitor Well Installation

CLIENT: Fina Oil and Chemical Company JOB NO.: 119505 DATE DRILLED: 9-22-87 WELL NO.: MW-39A

SITE: Big Spring, Texas ELEVATION: PAD 2482.88 TOP OF PVC CASING 2485.63

TOTAL DEPTH: 133.08' TOC CASING SIZE & TYPE: 2" ID PVC Flush Threaded SCREEN SIZE: 0.020 mill slot

WATER LEVEL: 87.50 REF.: TOC DATE: 10/1/87 TIME: 1434 Hrs. GEOLOGIST: Robert L. Sherrill

DEPTH	N. VALUE (BLOW/FT)	POCKET PENETROMETER (TONS/FT²)	SYMBOL	STRATIGRAPHY	SAMPLE DESCRIPTION
			GP		SANDY GRAVEL - similar to above except 15% fine sand
120			GP		SANDY GRAVEL - similar to above
130			CH		CLAY - highly plastic, hard, dry, red — Ogallala FM / Dockum Group
140			CH		CLAY - similar to above
					Boring Terminated at 140 feet below grade

COMPLETION DATA

MATERIAL SETTING	MATERIAL DESCRIPTION CONT'D.
130	Filter Pack
132	Collapse
140	

JONES AND NEUSE, INC. CONSULTING ENGINEERS AUSTIN, TEXAS

Monitor Well Installation

CLIENT: Fina Oil and Chemical Company JOB NO.: 119505 DATE DRILLED: 9-10-87 WELL NO.: MW-40

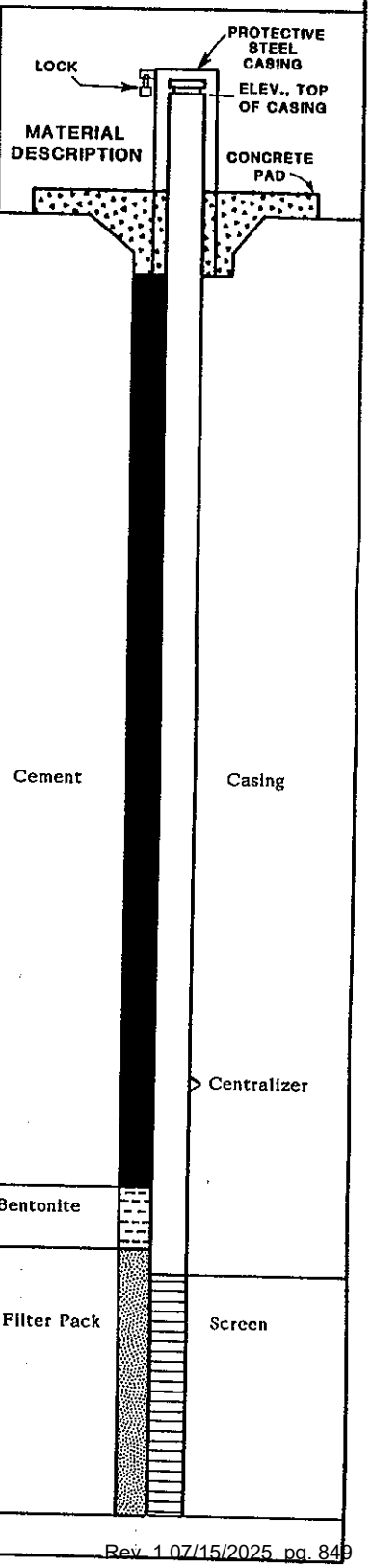
SITE: Big Spring, Texas ELEVATION: PAD 2477.28 TOP OF PVC CASING 2480.01

TOTAL DEPTH: 109.89' TOC CASING SIZE & TYPE: 2" Sch 40 PVC FLUSH THREADED SCREEN SIZE: 0.020 mill slot

WATER LEVEL: 83.55' REF.: TOC DATE: 10-1-87 TIME: 1450 hrs. GEOLOGIST: Robert L. Sherrill

DEPTH	N. VALUE (BLOW/FT)	POCKET PENETROMETER (TONS/FT²)	SYMBOL	STRATIGRAPHY	SAMPLE DESCRIPTION
10			SM		SILTY SAND - uniform medium sand, 10% silt, compact, red, dry
20			SP		SAND - uniform fine, loose, red, dry
30			SP		SAND - similar to above
40			SP		SAND - similar to above
50			SP		SAND - uniform fine, dense, 15% calcareous cement, light, red, dry
60			SP		SAND - similar to above
70			SP		SAND - similar to above
80			SP		SAND - similar to above except very dense
					Top of Saturation 88.0' below grade
90			SP		SAND - uniform fine, loose, red, saturated, <5% very fine caliche gravel
100			SP		SAND - uniform fine, loose, red, saturated
					BORING TERMINATED AT 107 FEET BELOW GRADE

COMPLETION DATA



JONES AND NEUSE, INC. CONSULTING ENGINEERS AUSTIN, TEXAS

Monitor Well Installation

CLIENT: Fina Oil and Chemical Company JOB NO.: 119505 DATE DRILLED: 9/8/87 WELL NO.: MW-40A

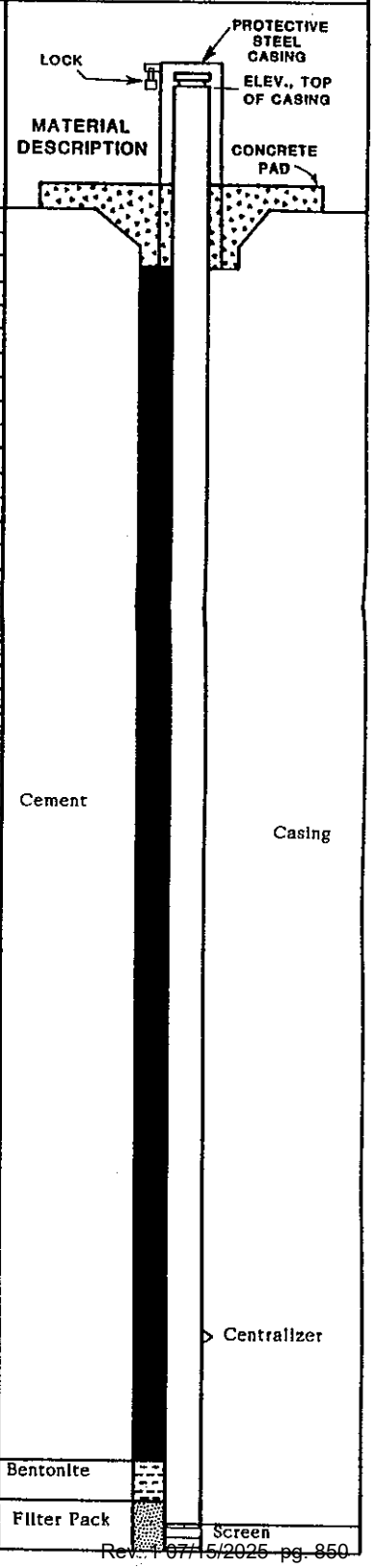
SITE: Big Spring, Texas ELEVATION: PAD 2477.32 TOP OF PVC CASING 2479.42

TOTAL DEPTH: 130.13' TOC CASING SIZE & TYPE: 2" Sch 40 PVC FLUSH THREADED SCREEN SIZE: 0.020 mill slot

WATER LEVEL: 83.64' REF.: TOC DATE: 10-1-87 TIME: 1454 hrs. GEOLOGIST: Robert Sherrill

DEPTH	N. VALUE (BLOW/FT)	POCKET PENETROMETER (TONS/FT²)	SYMBOL	STRATIGRAPHY	SAMPLE DESCRIPTION
10			SM		SILTY SAND - uniform medium sand, 10% silt, compact, red, dry
20			SP		SAND - uniform fine, loose, red, dry
30			SP		SAND - similar to above
40			SP		SAND - similar to above
50			SP		SAND - uniform fine, dense, 15% calcareous cement, light red, dry
60			SP		SAND - similar to above
70			SP		SAND - similar to above
80			SP		SAND - similar to above
					▼ Top of Saturation 88.0' BELOW GRADE
90			SP		SAND - uniform fine, loose, red, saturated, <5% very fine caliche gravel
100			SP		SAND - uniform fine, loose, red, saturated
			GP		SANDY GRAVEL

COMPLETION DATA



JONES AND NEUSE, INC. CONSULTING ENGINEERS' AUSTIN, TEXAS

Monitor Well Installation

CLIENT: Fina Oil and Chemical Company JOB NO.: 119505 DATE DRILLED: 9-8-87 WELL NO.: MW-40A

SITE: Big Spring, Texas ELEVATION: PAD 2477.32 TOP OF PVC CASING 2479.42

TOTAL DEPTH: 130.13' TOC CASING SIZE & TYPE: 2" Sch 40 PVC FLUSH THREADED SCREEN SIZE: 0.020 mill slot

WATER LEVEL: 83.64' REF.: TOC DATE: 10-1-87 TIME: 1454 hrs. GEOLOGIST: Robert L. Sherrill

DEPTH	N. VALUE (BLOW/FT)	POCKET PENETROMETER (TONS/FT²)	SYMBOL	STRATIGRAPHY	SAMPLE DESCRIPTION
			GP		SANDY GRAVEL - uniform fine chert and calcareous gravel, loose, red, saturated
120			GP		SANDY GRAVEL - similar to above
			CH		CLAY - highly plastic, hard, red, damp — Ogallala FM / Dockum Group
130					Boring Terminated at 130 feet below grade

COMPLETION DATA

MATERIAL SETTING

MATERIAL DESCRIPTION CONT'D.

128

130

Filter Sand

Screen

Monitor Well Installation

CLIENT: Fina Oil and Chemical Company JOB NO.: 119505 DATE DRILLED: 9-13-87 WELL NO.: MW-41

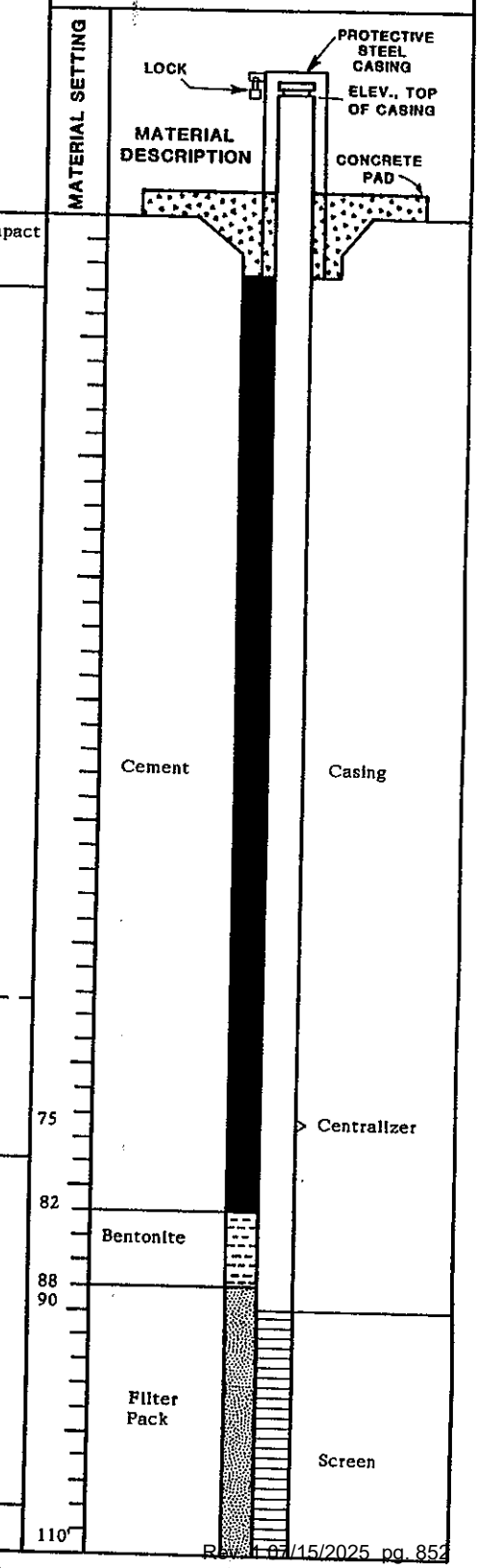
SITE: Big Spring, Texas ELEVATION: PAD 2486.59 TOP OF PVC CASING 2489.34

TOTAL DEPTH: 113.30' TOC CASING SIZE & TYPE: 2" ID PVC Flush Threaded SCREEN SIZE: 0.020 mill slot

WATER LEVEL: 91.80' REF.: TOC DATE: 10-1-87 TIME: 1510 Hours GEOLOGIST: Robert L. Sherrill

DEPTH	N. VALUE (BLOW/FT)	POCKET PENETROMETER (TONS/FT²)	SYMBOL	STRATIGRAPHY	SAMPLE DESCRIPTION
			SM		SILTY SAND - uniform fine grained, 15% highly plastic fines, compact grey, damp
10			SP		SAND - uniform fine grained, loose, red, dry
20			SP		SAND - similar to above
30			SP		SAND - similar to above
40			SP		SAND - similar to above
50			SP		SAND - similar to above
60			SP		SAND - similar to above
70			SP		SAND - uniform fine grain, dense, 15% calcareous cement, red, dry
80			SP		SAND - uniform fine grain, loose, red, moist
90			SP		SAND - similar to above ▼ Top of Saturation at 91.0' below grade
100			SP		SAND - similar to above except with minor calcareous fine gravel
			GP		SANDY GRAVEL - fine calcareous and chert gravel, 45% fine sand, loose, red

COMPLETION DATA



JONES AND NEUSE, INC. CONSULTING ENGINEERS AUSTIN, TEXAS

Monitor Well Installation

CLIENT: Fina Oil and Chemical Company JOB NO.: 119505 DATE DRILLED: 9-13-87 WELL NO.: MW-41

SITE: Big Spring, Texas ELEVATION: PAD 2486.59 TOP OF PVC CASING 2489.34

TOTAL DEPTH: 113.30' TOC CASING SIZE & TYPE: 2" ID PVC Flush Threaded SCREEN SIZE: 0.020 mill slot

WATER LEVEL: 91.80' REF.: TOC DATE: 10-1-87 TIME: 1510 hrs GEOLOGIST: Robert L. Sherrill

DEPTH	N. VALUE (BLOW/FT)	POCKET PENETROMETER (TONS/FT²)	SYMBOL	STRATIGRAPHY	SAMPLE DESCRIPTION	COMPLETION DATA: MATERIAL SETTING	COMPLETION DATA: MATERIAL DESCRIPTION CONT'D.
			GP		SANDY GRAVEL - similar to above	113	
					Boring Terminated at 113' below grade		

120 130 140 150 160 170 180 190 200 210

JONES AND NEUSE, INC. CONSULTING ENGINEERS AUSTIN, TEXAS

Monitor Well Installation

CLIENT: Fina Oil and Chemical Co. JOB NO.: 119505 DATE DRILLED: 9-12-87 WELL NO.: MW-41A

SITE: Big Spring, Texas ELEVATION: PAD 2487.05 TOP OF PVC CASING 2489.88

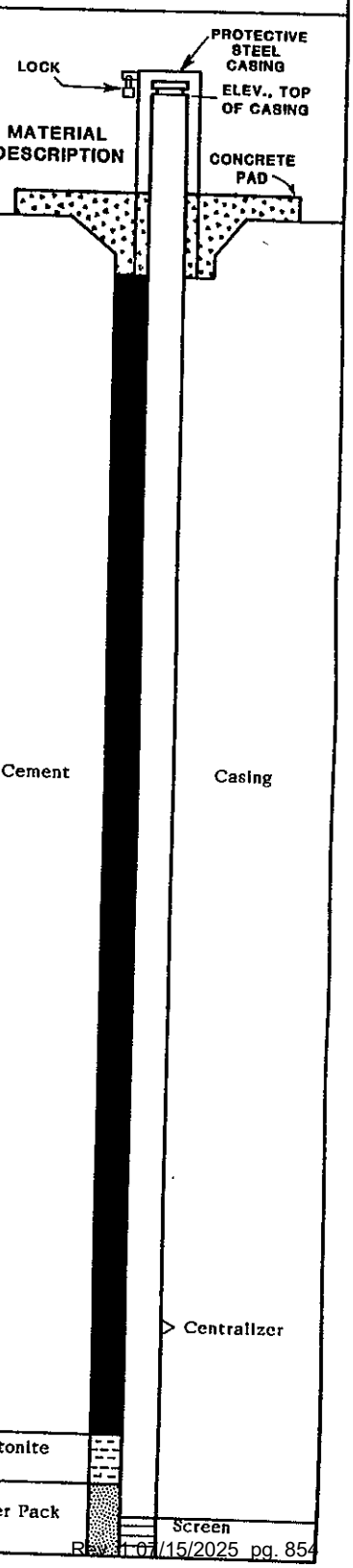
TOTAL DEPTH: 132.72' CASING SIZE & TYPE: 2" ID PVC Flush Threaded SCREEN SIZE: 0.020 mill slot

WATER LEVEL: 92.31' REF.: TOC DATE: 10-1-87 TIME: 1514 hrs. GEOLOGIST: Robert L. Sherrill

DEPTH	N. VALUE (BLOW/FT)	POCKET PENETROMETER (TONS/FT²)	SYMBOL	STRATIGRAPHY	SAMPLE DESCRIPTION
			SM		SILTY SAND - uniform fine grained, 15% highly plastic fines, compact grey, damp
10			SP		SAND - uniform fine grained, loose, red, dry
20			SP		SAND - similar to above
30			SP		SAND - similar to above
40			SP		SAND - similar to above
50			SP		SAND - similar to above
60			SP		SAND - similar to above
70			SP		SAND - uniform fine grain, dense, 15% calcareous cement, red, dry
80			SP		SAND - uniform fine grain, loose, red, moist
90			SP		SAND - similar to above Top of Saturation at 91.0' below grade
100			SP		SAND - similar to above except with minor calcareous fine gravel
			GP		SANDY GRAVEL - fine calcareous and chert gravel, 45% fine sand, loose, red

COMPLETION DATA

MATERIAL SETTING / MATERIAL DESCRIPTION



JONES AND NEUSE, INC. CONSULTING ENGINEERS AUSTIN, TEXAS

Monitor Well Installation

CLIENT: Fina Oil and Chemical Co JOB NO.: 119505 DATE DRILLED: 9-12-87 WELL NO.: MW-41A

SITE: Big Spring, Texas ELEVATION: PAD 2487.05 TOP OF PVC CASING 2489.88

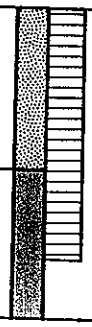
TOTAL DEPTH: 132.72' TOC CASING SIZE & TYPE: 2" ID PVC Flush Threaded SCREEN SIZE: 0.020 mill slot

WATER LEVEL: 92.31' REF.: TOC DATE: 10-1-87 TIME: 1514 hrs. GEOLOGIST: Robert L. Sherrill

DEPTH	N. VALUE (BLOW/FT)	POCKET PENETROMETER (TONS/FT²)	SYMBOL	STRATIGRAPHY	SAMPLE DESCRIPTION
120			GP		SANDY GRAVEL - fine calcareous and chert gravel, 45% fine sand, loose, red
			GP		SANDY GRAVEL - similar to above
130			CH		CLAY - highly plastic, dense, red, dry — Ogallala FM, Dockum Group
					Boring Terminated at 135 feet below grade
140					
150					
160					
170					
180					
190					
200					
210					

COMPLETION DATA

MATERIAL SETTING	MATERIAL DESCRIPTION CONT'D.
123.2	Filter Pack
130	Collapse
135	



JONES AND NEUSE, INC. CONSULTING ENGINEERS AUSTIN, TEXAS

Alon USA, LP
Alon USA Big Spring Refinery – Big Spring, TX

Hazardous Waste Permit 50140
Part B Application
SWR No. 30083 / RN100250869 / CN600881783

SECTION VII
CLOSURE AND POST-CLOSURE

VII. Closure and Post-Closure Plans

Provide all Part B responsive information in Appendix VII. When preparing the physical format organize your submittal using the Format of Hazardous Waste permit Application and Instructions.

For multiple units provide an include all Part B responsive information in a separate Appendix for each unit.

Submit a full closure plan and post-closure plan, if applicable, which contains all the information required by 30 TAC 335.8, 335.169, 335.172, 335.174, 335.177, 335.178, 335.551-335.569, 30 TAC Chapter 350, 40 CFR 264.112, 264.118, 264.178, 264.197, 264.228, 264.258, 264.280, 264.310, 264.351, 264.575, 264.601, 264.603, 264.1102, 270.14(b)(13), 270.17(f), 270.18(h), 270.20(f), 270.21(e), 270.23(a)(2) & (3), and 270.26(c)(16) where applicable. The owner of property on which an existing disposal facility is located must also submit documentation that a notation has been placed in the deed to the facility that will in perpetuity notify any potential purchasers of the property that the land has been used to manage hazardous wastes and its use is restricted (see 30 TAC 335.5). For hazardous waste disposal units that were closed before submission of the application, the applicant should submit documentation to show that plats and notices required under 40 CFR 264.116 and 264.119 have been filed.

A. Closure

This section applies to the owners and operators of all hazardous waste management facilities to be permitted. The applicant must close the facility in a manner that minimizes need for further maintenance and controls, or eliminates, to the extent necessary to protect human health and the environment, the post-closure release of hazardous waste, hazardous constituents, leachate, contaminated rainfall, or waste decomposition products to the groundwater, surface waters, or to the atmosphere.

The facility type and type of unit to be closed can determine the level of detail sufficient for a closure plan.

For each unit to be permitted, complete Table VII.A. - Unit Closure and list the facility components to be decontaminated, possible methods of decontamination, and possible methods of disposal of wastes and waste residues generated during unit closure. All ancillary components must be included in calculating closure cost estimates.

Additionally, if the applicant plans to close a surface impoundment in accordance with 30 TAC 335.169(a)(1) and the impoundment does not comply with the liner requirements of 30 TAC Section 335.168(a) then the closure plan for the impoundment must include both a plan for complying with 30 TAC 335.169(a)(1) and a contingent plan for complying with 30 TAC 335.169(a)(2).

Guidance on design of a closure cap and final cover for landfills is given in TCEQ Technical Guideline No. 3, and EPA publication 530-SW-85-014 presents guidance on construction quality assurance of liner construction.

If a waste pile does not comply with the liner requirements of 30 TAC Section 335.170(a)(1) then the closure plan for the waste pile must include both a plan for complying with 40 CFR 264.258(a) and a contingent plan for complying with 40 CFR 264.258(b).

The final certification of closure of a land treatment unit may be prepared by an independent licensed Professional Geoscientist in lieu of an independent licensed Professional Engineer. [30 TAC 335.172(b)]

B. Closure Cost Estimate (including contingent closure) [30 TAC 335.178, 40 CFR 264.142]

This section applies to owners or operators of all hazardous waste facilities, except state and federal agencies. A detailed estimate, in current dollars, of the cost of closing the facility should be included in the report. The cost estimate must include the cost of closure at the point in the facilities operating life when the extent and manner of its operation would make closure the most expensive. The TCEQ has published Technical Guideline No. 10, Closure and Post-Closure Cost Estimates, for calculating closure costs which should be consulted. Closure costs should be developed on the basis of abandonment of the site at full capacity and closure activities to be conducted by a third party with no operable on-site equipment. The costs for closing each unit must be detailed.

1. If closure costs are based on contractor bids, the applicant should submit a copy of the bid specification and each contractor's response.

2. If closure costs are based on a detailed analysis, the applicant should submit details of item costs and number of each item, and details of costs for equipment rental, third party labor and supervision, transportation, analytical costs, etc. Provide an itemized cost on Table VII.B. - Unit Closure Cost Estimate for a complete, third party permitted facility closure.

   As units are added or deleted from these tables through future permit amendments or modifications, the remaining itemized unit costs should be updated for inflation when re-calculating the revised total cost in current dollars.

3. The closure plan may propose on-site disposal of wastes, residues, etc. during closure of a unit, and this may be executed if on-site capacity exists in other units during closure of a unit. However, the cost estimate for closure must be based on off-site shipment and disposal during closure of all wastes, waste residues, wastes generated by decontamination, contaminated stormwater, and leachate.

4. For each surface impoundment, waste pile, or tank system required to have a contingent closure plan, the cost for closure under the contingent closure plan should be detailed, as well as the cost of proposed closure. The more expensive of the cost of the proposed closure of a unit versus the cost of the contingent closure of the unit should be used in the total facility closure cost estimate.

C. Post-closure

This section applies to owners or operators of all hazardous waste disposal facilities. This section also applies to certain waste piles, tanks and surface impoundments from which the owner or operator intends to remove wastes at closure but which are required to have contingent post-closure plans.

For Landfills, and Waste Piles, Surface Impoundments, and Tanks Closed as a Landfill

1. Provide as-built plans and specifications for the final cover system, individually for each unit that is sealed, signed and dated by a licensed professional engineer with current Texas registration along with the Registered Engineering Firm's name and

Registration Number would satisfy this requirement; Other as-built plans and specifications for the unit may be submitted upon request.

2. Complete the following tables, as applicable:

a. Complete Table V.G.1 - Landfills and list the landfills (and number of cells, if applicable) covered by this application. List the waste(s) managed in each unit and the rated capacity or size of the unit. If wastes are segregated in some manner, list the cell number in which wastes are placed next to each waste type.

b. Table V.G.3. - Landfill Liner System and specify the type of liner used for the landfill.

c. Table V.G.4. - Landfill Leachate Collection System used for the landfill.

d. Table V.E.1 - Waste Piles and list the waste piles covered by this application. List the waste managed in each unit and the rated capacity or size of the unit.

e. Table V.E. 3 - Waste Pile Liner System and specify the type of containment/liner system.

f. Table V.D.1 - Surface Impoundments and list the surface impoundments, covered by this application, to be permitted. List the waste(s) managed in each unit and the rated capacity or size of each unit.

g. Table V.D. 6. - Surface Impoundment Liner System for each surface impoundment to be permitted.

h. Table V.C. Tanks and Tank Systems.

Post-closure care of each hazardous waste management unit must continue for 30 years after the date of completing closure of the unit and must consist of monitoring and reporting of the groundwater monitoring systems in addition to the maintenance and monitoring of waste containment systems. Continuation of certain security requirements may be necessary after the date of closure. Post-closure use of property on or in which hazardous waste remains after closure must never be allowed to disrupt the integrity of the containment system. In addition, submit the following information.

1. The post-closure care plan for a landfill or of a surface impoundment, waste pile, miscellaneous unit, or tank system closed with wastes or waste constituents left in place, or closed under a contingent closure plan, must demonstrate compliance with 30 TAC 335.174(b).

2. The name, address, and phone number of the person or office to contact about the disposal facility during the post-closure period; and

3. A discussion of the future use of the land associated with each unit.

4. For landfills, surface impoundments, waste piles, and land treatment areas closed under interim status, submit the required documentation of 40 CFR 270.14(b)(14).

5. Landfills, surface impoundments, waste piles and land treatment areas that received hazardous wastes after July 26, 1982 or for which closure was certified after January 26, 1983 must be included in post-closure care plans unless they have been determined to have closed by removal equivalent to the closure standards in 40 CFR 264 Subpart G. If such a demonstration has been made pursuant to 40 CFR 270.1(c)(5), but an equivalency determination has not been

made, please submit a copy of the demonstration documentation. If an equivalency determination has been made pursuant to 40 CFR 270.1(c)(6), applicant should submit a copy of the determination. Complete Table VII.C.5. - Land-Based Units Closed Under Interim Status for all land based units closed under interim status.

D. Post-closure Cost Estimate [40 CFR 264.144]

This section regarding post-closure cost estimate applies to owners or operators of all hazardous waste disposal facilities, except state and federal agencies, and certain waste piles, tank systems, and surface impoundments from which the owner or operator intends to remove wastes at closure, but which are required to have contingent closure and post-closure plans. A detailed estimate, in current dollars, of the annual cost of monitoring and maintenance of the facility in accordance with the applicable post-closure regulations must be included in the report. The TCEQ has published Technical Guideline No. 10 for calculating post-closure costs, which should be consulted. Costs should be developed in detail for 30 years of post-closure care activities to be conducted by a third party, for each applicable unit.

1. The applicant should submit details of item costs and number of each item for off-site disposal of leachate and bailed monitor well water, labor and supervision, monitor well sampling and analyses, inspection and repair of the cap(s), mowing and re-seeding of the vegetative cover, maintaining site security, etc. Provide an itemized cost estimate on Table VII.D. - Unit Post-Closure Cost Estimate for complete, third party permitted facility post-closure care.

2. As units are added or deleted from these tables through future permit amendments or modifications, the remaining itemized unit costs should be updated for inflation when re-calculating the revised total cost in current dollars.

3. Total annual cost of post-closure care for the facility including costs of contingent post-closure care should be multiplied by 30 years.

E. Closure and Post-Closure Cost Summary

Please Complete Table VII.E.1. - Permitted Unit Closure Cost Summary

Please Complete Table VII.E.2. - Permitted Unit Post-Closure Cost Summary

Alon USA, LP
Alon USA Big Spring Refinery
Big Spring, TX

Hazardous Waste Permit 50140 - Part B
Application SWR No. 30083 / RN100250869 / CN6001881783

APPENDIX VII
APPLICATION RESPONSES
Closure and Post-Closure

Alon USA Big Spring Refinery

Attachment VII.A
CLOSURE

SWR No. 30083 / RN100250869 / CN600881783

Alon USA Big Spring Refinery - Big Spring, Texas

April 30, 1998
(Revision #1 – April 19, 1999)
(Revision #2 – January 28, 2000)
(Revision #3 – January 11, 2001)
(Class 2 Modification Request – May 15, 2003)
(Revision #4 - March 15, 2024) [Updated Names]

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Figure VII.A-2 Areal Extent of Elevated Lead Concentrations in Cell #3 North Soils (0-12”)
Figure VII.A-3 Areal Extent of Elevated Lead Concentrations in Cell #3 North Soils (54-60”)

SECTION 1 INTRODUCTION

The closure plans presented herein have been prepared to outline the steps the facility will take to close the active Container Storage Area (CSA) and the inactive Site H Land Treatment Unit (Site H LTU) for which a permit is sought by virtue of this renewal application. Since the Site E Land Treatment Unit (Site E LTU) was certified closed in 1996 and is currently under post-closure care, a closure plan is not applicable for this hazardous waste management (HWM) unit. The closure plans for the CSA (Section 2) and the Site H LTU (Section 3) have been prepared in accordance with applicable portions of 40 Code of Federal Regulations (CPR) Part 264, Subparts G, I, and M as adopted by the TCEQ. Copies of these plans will be maintained at the Big Spring facility and will be available for review.

Alon USA Big Spring Refinery (FACILITY) may choose to amend these closure plans at any time during the active life of the facility. In any case, the plans will be amended whenever changes in the operating plan or facility design affect the closure procedures or whenever there is a change in the expected year of the closure of the facility. Any proposed change will be promptly submitted to the TCEQ for approval in accordance with Title 30 Texas Administrative Code (TAC) Section 335.152. Once Alon decides to close any or both of the HWM units at the facility, the Executive Director of the TCEQ will be notified in accordance with 30 TAC Section 335.6 at least 90 days prior to the initiation of any closure activities. The exact date of final closure of the units are unknown nor anticipated. It is likely that the individual HWM units will be closed as necessary for replacement or upgrading. Whether closed collectively or individually, the permitted HWM units will be closed by the methods indicated in these plans.

SECTION 2 CONTAINER STORAGE AREA

The following closure procedures will be conducted at the CSA:

- Removal of all waste drums;
- Decontamination of CSA areas and offsite disposal of residual decontamination materials;
- Demolition, removal, and offsite disposal of CSA structures;
- Evaluation of underlying soils for potential contamination; and
- Certification of closure

2.1 Closure Procedures

The closure procedures associated with each of these activities are presented herein.

2.1.1 Waste Removal

Prior to initiating closure procedures, the CSA will be emptied of all wastes. The FACILITY will initiate closure of the CSA after the transfer of last volume of waste for offsite disposal at an authorized TSDF. However, the maximum inventory of waste at the time of closure is conservatively assumed to be the total storage capacity of the CSA (22,000 gallons).

2.1.2 Decontamination of CSA Structures

All coatings and waste residuals will be removed from the exterior of the asphalt surfaces (Areas A and B) and the concrete slab and secondary containment system (Area C) by sandblasting and/or high-pressure washing. All decontamination activities (i.e., sandblasting and hydroblasting) will be performed by trained personnel under qualified supervision. The decontaminated areas will be visually inspected following sandblasting to ensure that all waste and blasting-sand residuals have been removed. The decontamination will be performed with the asphalt surfaces and concrete slab/secondary containment structures intact so that all rinsate can be collected. The blast sand and the rinsate will be collected for transport to a RCRA-authorized offsite treatment, storage, or disposal facility (TSDF). Final rinsate samples will be collected for analysis of Skinner List organic constituents to verify that the decontamination of the CSA structures was effective.

2.1.3 Demolition and Removal of CSA Structures

During final closure, the asphalt surfaces (Areas A and B) and concrete slab/ secondary containment system (Area C) will be demolished. The demolished materials (i.e., asphalt and concrete) will be shipped offsite to a RCRA-authorized TSDF for disposal.

2.1.4 Underlying Soils Evaluation

After the demolished materials have been removed, the underlying soils will be visually inspected for evidence of contamination. Soil samples will be collected and analyzed as determined appropriate. The soil samples will be analyzed for the presence of the 40 CFR §261 Appendix VIII constituents that characterize the wastes historically managed within

the CSA. The analyses will be performed utilizing Methods 6010 (RCRA metals), 8260 (volatile organics), and 8270 (semivolatile organics) as specified in *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (EPA SW-846)* or equivalent methods approved by the Executive Director of the TCEQ. As necessary, contaminated soils will be excavated and shipped offsite for disposal.

2.1.5 Certification of Closure

Certification that clean closure under 40 CFR §264.178 has been attained will be provided to the TCEQ if (1) metal concentrations within the underlying soils are below background and (2) concentrations of organics are found to be less than or equal to the practical quantitative limits (PQLs) established in EPA SW-846. Within 60 days of completion of final closure, the FACILITY will submit a certification report to the Executive Director of the TCEQ, signed by an officer of the FACIITY and an independent registered professional engineer licensed in Texas, that the CSA has been closed in accordance with the specifications in this closure plan.

2.2 Closure Schedule

After the decision has been made to terminate the operation of the CSA, the FACILITY will initiate the implementation of this closure plan. As previously noted, the FACILITY will notify the Executive Director of the TCEQ at least 90 days prior to initiation of closure activities in accordance with 30 TAC Section 335.6.

The schedule for closure of the CSA is presented in Table VII.A-1. As indicated in the closure schedule, the total estimated time to complete closure for the CSA is 90 days. The closure schedule assumes that the CSA will be clean closed pursuant to 40 CFR §264.178.

Preparation of the closure schedule was based upon the following assumptions:

- Major tasks are described on the closure schedule. These tasks will be sequenced in the field to ensure that the project is completed in the minimum time possible;
- Estimates of time requirements to complete the various closure tasks assume that the necessary capacity of contractor services will be available at the time of closure; and
- Progress toward completion of closure will not be hindered by events such as labor strikes, materials shortages, supply-chain issues, extreme episodes of inclement weather, or catastrophic occurrences beyond the ability of the FACILITY to foresee prior to, or during, the execution of the closure tasks.

As a consequence of the above-noted assumptions upon which the closure schedule was based, close coordination between the various tasks will be required. No allowance is made for unavoidable delays beyond the control of Alon. In the event that a significant delay occurs that materially affects the time of completion of the closure tasks as scheduled, the FACILITY will notify the TCEQ and take appropriate actions to minimize the duration and effect of the delay.

2.3 Contingent In-Place Closure

In the unlikely event that contaminated soils cannot be removed and the unit must be closed in place, the FACILITY will submit to the TCEQ (for approval) a contingent closure plan that outlines the procedures to close the unit as a landfill pursuant to 40 CFR §264.310. A revised closure schedule will be provided within the contingent closure plan.

SECTION 3 SITE H LAND TREATMENT UNIT

The closure procedures and methods of construction described in this section have been developed to ensure that the closure of the Site H LTU will be protective of human health and the environment. Closure of the Site H LTU will be in accordance with the applicable procedures outlined in 40 CPR Part 264, Subparts G and M and will include the degradation monitoring of organic constituents within the surficial soils, the in-place stabilization of lead contaminated soils in the northern portion of Cell #3, and the establishment of a vegetative cover over the unit utilizing native grasses that are amenable to the arid West Texas climate.

A coordinated group of closure procedures that will be sequenced in the field in order to complete the closure of the Site H LTU include the following:

- Degradation monitoring;
- Remediation of Cell #3 North;
- Subgrade preparation;
- Establishment of vegetative cover;
- Equipment decontamination; and
- Certification of closure.

3.1 Closure Procedures

The closure procedures associated with each of these activities are presented herein.

3.1.1 Degradation Monitoring

The initial phase of closure operations at the Site H LTU included degradation monitoring to ensure that the organic constituents within the wastes historically applied to the unit have been biologically degraded to the maximum extent practicable prior to the placement of a final cover. During this phase of closure, the rate of biodegradation was monitored using oil and grease (O&G) as the indicator parameter of hydrocarbon concentrations for the shallow soils of the land treatment zone (LTZ). For the purpose of monitoring O&G, each of the four Site I-I LTU cells was subdivided into six sampling areas as shown on Figure VI.A-1. The center of each identified sampling area was sampled on a monthly basis from April 2002 through December 2002. The first sampling event occurred within 10 days of the beginning of closure, with subsequent monthly events at 30-day intervals thereafter.

During the first monthly sampling event, a two-foot soil boring was advanced at each area center. Representative samples were collected from the 0-1′ depth interval from each soil core and analyzed for concentrations of O&G using EPA Method 413.1. The remaining portion of each core was visually inspected for the presence of oily material. Any identified oily material was brought up to the surface with a bulldozer or backhoe so it could be effectively treated. During the subsequent monthly sampling events, one foot soil borings were advanced at each area center with samples being collected from the 0-1′ interval for analysis of O&G concentrations. Degradation monitoring continued until December 2002,

when it was determined that O&G concentrations had decreased to an asymptotic (no further significant decrease) level.

3.1.2 Remediation of Cell #3 North

Based on the results of delineation investigations that were conducted in April and October 1997 (as presented in a report entitled Lead Delineation Investigation- Site H LTU Cell #3 Final Report that was submitted to the TCEQ in April 1998), Alon has determined that the areal extent of lead concentrations above (1) the maximum allowable concentration of 1,000 mg/kg within the surficial (0-12″) soils and (2) the established background level of 13.5 mg/kg within the treatment zone (54-60″) soils is widespread throughout the northern portion of Cell #3 of the Site H LTU. The extent of elevated lead concentrations within the surficial soils is estimated to encompass 0.3 acres (500 cubic yards) and is depicted on Figure VII.A-2. The extent of elevated lead concentrations within the lower treatment zone soils is estimated to encompass 0.4 acres (325 cubic yards) and is depicted on Figure VII.A-3. However, in order to address the remediation of the soils containing the elevated lead concentrations, Alon would have to consider an areal extent of 0.4 acres over the entire thickness (five feet) of the Cell #3 north soils (3,225 cubic yards).

As a result of the delineation investigations, the Cell #3 north area of the Site H LTU will require remediation prior to the establishment of a vegetative cover over the closed unit. Due to the potential danger of damage to the underlying liner system of the Site H LTU, excavation of the affected soils down to 60 inches in order to effect remediation is not a practicable option. Consequently, the following procedures will be implemented to accomplish the stabilization of the affected soils in the Cell #3 north area:

- The upper one foot (0-12″) of soils comprising the zone of incorporation (ZOI) will be excavated over a 0.4-acre area from within the northern portion of Cell #3 as determined by a combination of the areal extents depicted on Figures VII.A-2 and VII.A-3. The ZOI soils will be excavated in a single lift and will be placed in a stockpile on a designated area of Cell #3 adjacent to the excavation area;
- Stabilization of the excavated ZOI soils within the stockpile will be conducted on the LTU surface by mixing the appropriate stabilization agent(s) for the immobilization of lead into the soils utilizing a rota-tiller;
- Verification samples will be collected from the stockpile of stabilized ZOI soils and the samples will be subjected to Synthetic Precipitation Leaching Procedure (SPLP) analysis to confirm that lead does not leach at a concentration above the EPA action level for lead in groundwater (0.015 mg/L) from the stabilized soils;
- The next three and one-half feet (12-54″) of soils comprising the land treatment zone (LTZ) will be excavated (over the same 0.4-acre area of the northern portion of Cell #3 as were the ZOI soils) but will not be subjected to stabilization treatment. The LTZ soils will be excavated in one-foot lifts and will be placed in stockpiles on designated areas of Cell #3 adjacent to the excavation area;

- In situ stabilization of the lower six inches (54-60″) of soils comprising the below the base of the LTZ will be conducted (over the same 0.4-acre area of the northern portion of Cell #3 as were the ZOI and LTZ soils) through the addition of the appropriate stabilization agent(s) for the inmobilization of lead with subsequent mixing into the soils utilizing a rota-tiller. This operation will be conducted with extreme caution to eliminate any possibility of damaging the underlying liner system;
- Verification samples will be collected from the in situ stabilized soils and subjected to SPLP analysis to confirm that lead does not leach at a concentration above the EPA action level for lead in groundwater (0.015 mg/L) from the stabilized soils; and
- The excavated LTZ soils will initially be backfilled into the excavated area of Cell #3 north, followed by the backfilling of the stabilized ZOI soils into the remaining volume of excavated area. Any excess soils resulting from a volume increase due to the stabilization process will be utilized as fill material during subgrade preparation and compaction activities (see Section 3.1.3) to achieve the desired slopes for the vegetative cover (see Section 3.1.4).

The stabilization of the impacted soils within the 0-12″ and 54-60″ depth intervals of the designated Cell #3 north area will serve to eliminate the potential for future vertical migration of lead concentrations from these soils.

3.1.3 Subgrade Preparation

After completion of the remediation of the Cell #3 north soils, the existing grade of the Site H LTU will be cut and filled as appropriate so that the vegetative cover will slope at approximately 3-5% from the northeast corner of the unit towards the Stormwater Collection Pond at the southwest corner of the unit, thereby approximating the slopes of the existing surface. Any necessary fill material will be imported from a clean borrow area within the FACILITY in order to achieve the desired slopes.

The surficial soils will be graded and tilled prior to establishing the vegetative cover utilizing appropriate earthworking equipment (e.g., bulldozer and tiller, respectively). The construction quality assurance/quality control (QA/QC) procedures that will be conducted for surface preparation include the following:

- Removal of unsuitable materials on the constructed surface (observation);
- Operation of tilling equipment on the constructed surface (observation);
- Number of passes with tilling equipment (observation); and
- Slope and elevation of completed surface (survey at 100-foot centers).

3.1.4 Establishment of Vegetative Cover

Alon will retain the services of an independent contractor capable of establishing a vegetative cover over the prepared subgrade of the Site H LTU. The vegetative cover will serve to prevent potential erosion of and minimize particulate emissions from the surface of the closed unit.

The vegetative cover will be established utilizing a BLM#2 seed mixture consisting of 25%

Sand Drop, 25% Sand Love, and 50% Plains Bristle. The proposed application rate is eight pounds per acre. The mixture will be applied utilizing a disc harrow to incorporate the pure, live seed into the surficial soils. Appropriate water application and fertilization procedures will be followed in order to ensure proper germination and growth of the grass seed.

The construction QA/QC procedures that will be followed for the establishment of the vegetative cover include the following:

- Operation of disc harrow on the surface soils (observation); and
- Coverage of unit surface with the incorporated seed mixture (observation).

The FACILITY proposes to establish the vegetative cover to the extent possible (considering the climate and conditions that exist in the Big Spring area) during the initial year of the post-closure period. Subsequent to this first year, the FACILITY will allow the vegetated cover to assume its natural growth pattern (e.g., no supplemental watering or fertilizers will be applied). Since the berms surrounding the Site H LTU will be maintained during the post-closure period (thereby facilitating continuing run-on and runoff control for the closed unit), the FACILITY contends that a native grass cover will be easier to maintain and will provide adequate erosion control.

3.1.5 Equipment Decontamination

Any vehicle or piece of equipment that has contacted Site H LTU soils will be decontaminated before being released from service. Equipment will be advanced to the perimeter of the unit and then will be cleaned of potentially contaminated soil using hand tools (such as brooms or shovels). The small amount of soil removed from equipment during decontamination operations will remain within the disposal area of the unit. The equipment will then be steam cleaned at the FACILITY's cleaning slab. The slab drains into the FACILITY's wastewater treatment system.

3.1.6 Certification of Closure

An authorized representative of the FACILITY and an independent registered professional engineer in the State of Texas, who are familiar with this closure plan and federal and state regulations applicable to the closure of hazardous waste land treatment units, will supervise all closure activities to ensure that all steps of the closure plan are correctly followed. Certification of closure will be submitted to the TCEQ by the independent registered professional engineer and the FACILITY. The certification will include documentation of closure procedures, test measurements, elevations, and other pertinent information concerning activities implemented under provisions of this closure plan and the incorporated CQA Plan.

Within 60 days of completion of final closure, the FACILIY will submit a certification report to the Executive Director of the TCEQ, signed by an officer of the FACILITY and an independent registered professional engineer, that the Site H LTU has been closed in accordance with the specifications in this closure plan. In accordance with 30 TAC §335.5, which requires disposal facilities to be recorded in the county deed records of the county in which the activity is located, the FACILITY will revise the permanent deed records of

Howard County to reflect the final closure of the Site H LTU.

3.2 Closure Schedule

The FACILITY initiated the implementation of this closure plan for the inactive Site H LTU upon TNRCC (predecessor to the TCEQ) issuance of the permit renewal in May 2001. Pursuant to the requirements of 30 TAC Section 335.6, the FACILITY provided notification in 2002 to the Executive Director of the TNRCC at least 90 days prior to initiation of closure activities.

The schedule for closure of the Site H LTU is presented in Table VII.A-2. As indicated in the closure schedule, the total estimated time to complete closure is 360 days. The closure schedule assumes that the Site H LTU will be closed pursuant to 40 CFR §264.280.

Preparation of the closure schedule was based upon the following assumptions:

- Major tasks are described on the closure schedule. These tasks will be sequenced in the field to ensure that the project is completed in the minimum time possible;
- Estimates of time requirements to complete the various closure tasks assume that the necessary capacity of contractor services will be available at the time of closure; and
- Progress toward completion of closure will not be hindered by events such as labor strikes, materials shortages, supply-chain issues, extreme episodes of inclement weather, or catastrophic occurrences beyond the ability of the FACILITY to foresee prior to, or during, the execution of the closure tasks.

As a consequence of the above-noted assumptions upon which the closure schedule was based, close coordination between the various tasks will be required. No allowance is made for unavoidable delays beyond the control of the FACILITY. In the event that a significant delay occurs that materially affects the time of completion of the closure tasks as scheduled, the FACILITY will notify the TCEQ and take appropriate actions to minimize the duration and effect of the delay.

TABLES

Table VII.A-1 Schedule for Closure of the Container Storage Area

Table VII.A-2 Schedule for Closure of the Site H Land Treatment Unit

Table VII.A-1

Schedule for Closure of the Container Storage Area

Time Period [(1)]	Closure Activity
Day 0 to 10	Remove all wastes remaining in the CSA for offsite dispoal at a RCRA-authorized TSDF.
Day 10 to 20	Sandblast/hydroblast asphalt/concrete structures to remove all waste residuals and offsite disposal of decontamination materials at a RCRA-authorized TSDF
Day 20 to 50	Demolish asphalt/concrete structures and offsite disposal at a RCRA-authorized TSDF
Dau 50 to 80	Inspect underlyiing soils for contamination and collect verification samples for clean closure (contingent soil removal).
Day 80 to 90	Develop closure certification report and submit report to the TCEQ

(1) Closure schedule commences upon TCEQ approval of closure plan and assumes that the CSA will be clean closed. In the event of a contingent in-place slosure, a revised closure schedule will be sumitted to the TCEQ as part of the contingent closure plan.

Table VII.A-2

Schedule for Closure of the Site H Land Treatment Unit

Time Period [1]	Closure Activity
Day 0 to 150	Conduct degradation monitoring of surficial LTU soils. An estimated five monthly sampling events will be conducted.
Day 150 to 210	Remediation of Cell #3 North utilizing excavating and in-situ stabilization technology to immobilize lead within the 0-60-inch depth intervals over a 0.4-acre area.
Day 210 to 270	Subgrade preparation of LTU surface prior to establishment of vegetative cover, including final surevey. Additional fill may be required in order to achieve final slopes of 3% to 5%.
Day 270 to 280	Decontamination of all equipment that contacted Site H LTU soils during subgrade preparation activities.
Day 280 to 340	Establishment of vegetative cover.
Day 340 to 360	Develop closure certification report and submit the report to the TCEQ

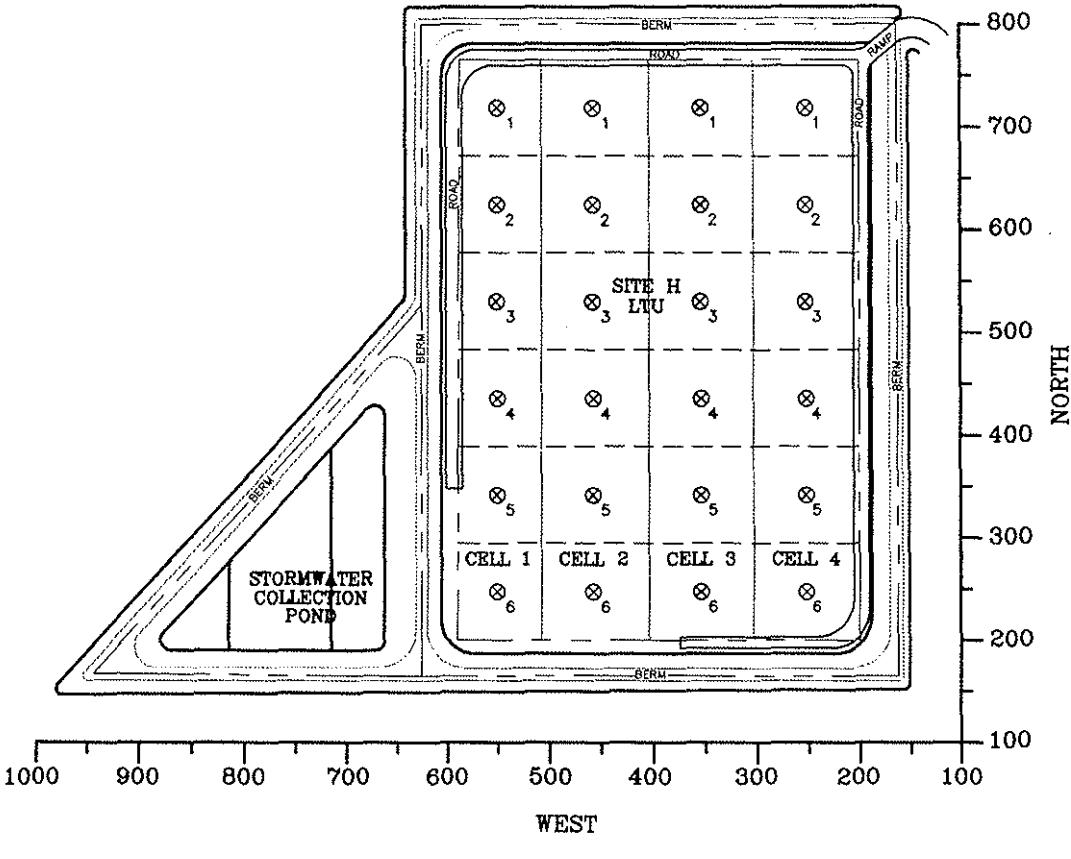
(1) Closure schedule commences upon TCEQ approval of closure plan.

FIGURES

Figure VII.A-1 Sampling Locations for Degradation Monitoring of Site H LTU

Figure VII.A-2 Areal Extent of Elevated Lead Concentration in Cell #3 North Soils (0-12")

Figure VII.A-3 Areal Extent of Elevated Lead Concentrations in Cell #3 North Soils (54-60")



LEGEND

⊗1 MONTHLY SAMPLING LOCATION & NUMBER

SCALE IN FEET

0 150 300

N

FIGURE VII.A-1
SAMPLING LOCATIONS FOR DEGRADATION MONITORING OF SITE H LTU

FINA Fina Oil & Chemical Company
Big Spring Refinery–Big Spring, Texas

RMT

DWN. BY:	DWH
APPROVED BY:	R.R.P.
DATE:	4/8/98
PROJ. #	50-01858.32
FILE #	18583211

Rev: 07/15/2025_pg

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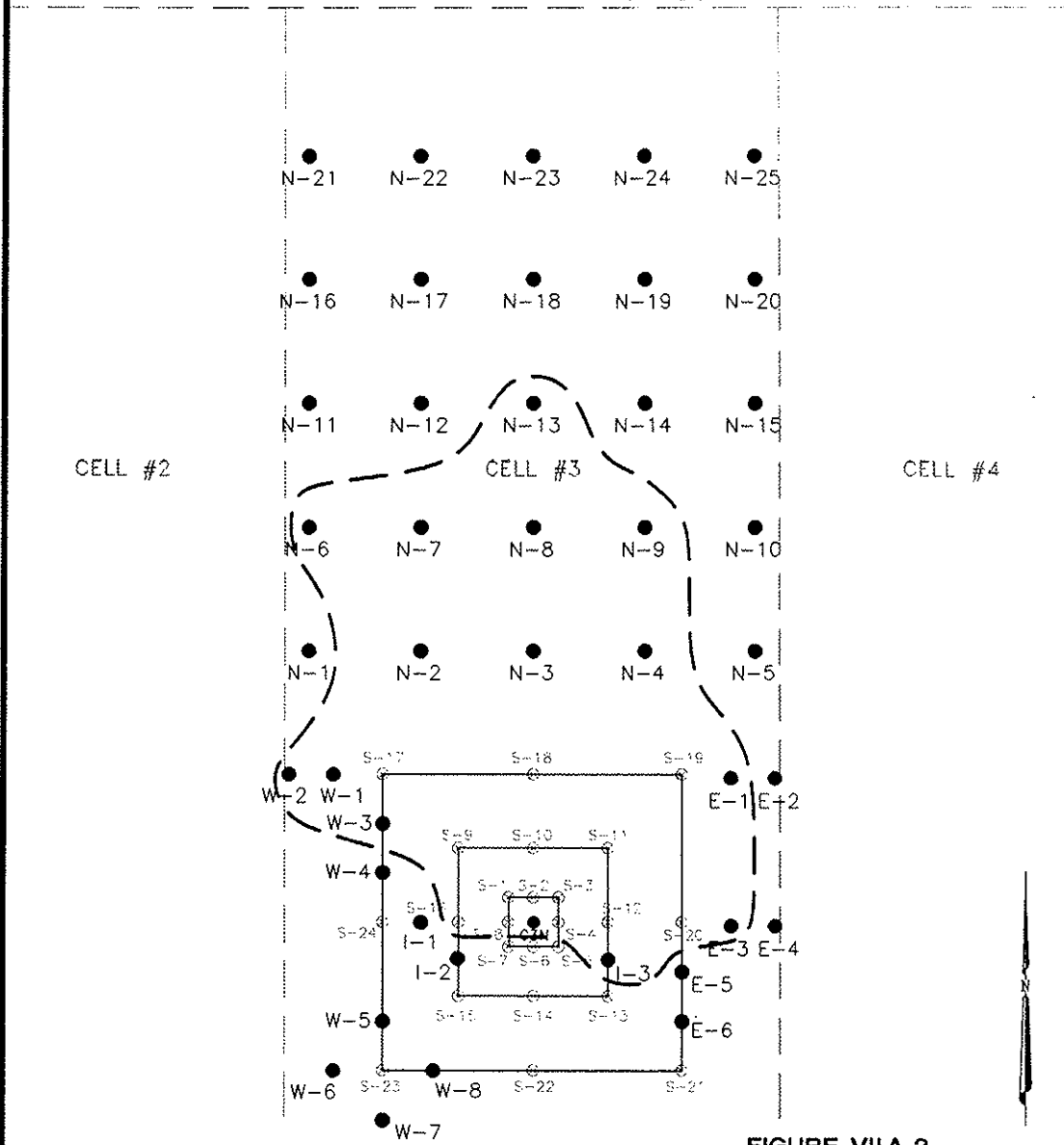

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Plot Date: 4/9/98
DWH
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Scale:
PLOT DATA
Drawing Name: 18583212.DWG

FIGURE VII.A-2
AREAL EXTENT OF ELEVATED LEAD CONCENTRATIONS IN CELL #3 NORTH SOILS (0-12")

Fina Oil & Chemical Company
Big Spring Refinery – Big Spring, Texas

LEGEND

- ● C3N EXISTING C3N SAMPLE LOCATION & NUMBER (7/96)
- ⊗ S-23 PHASE 1 SAMPLING LOCATION & NUMBER
- ● N-14 PHASE 2 DEEP SAMPLING LOCATION & NUMBER
- ● N-6 PHASE 2 SHALLOW SAMPLING LOCATION & NUMBER
- — — APPROXIMATE AREAL EXTENT OF ELEVATED LEAD CONCENTRATIONS

SCALE IN FEET

0 15 30 60

RMT INC.

DWN. BY:	DWH
APPROVED BY:	R.R.P.
DATE:	4/9/98
FIG. #	50-01858.32
FILE #	18583212

Re 2025

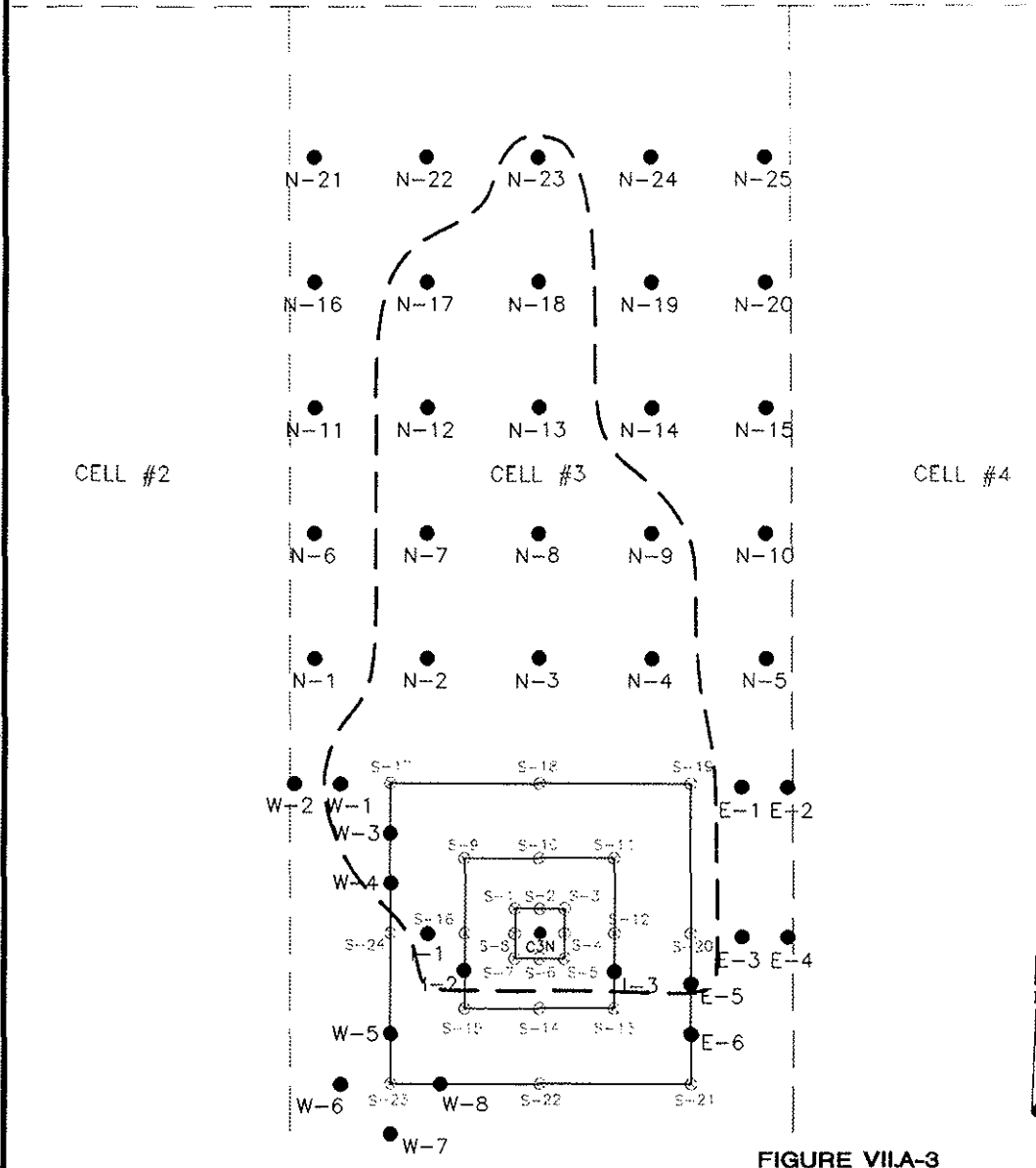

FIGURE VII.A-3
AREAL EXTENT OF ELEVATED LEAD CONCENTRATIONS IN CELL #3 NORTH SOILS (54'-60')

LEGEND

- ● C3N EXISTING C3N SAMPLE LOCATION & NUMBER (7/96)
- ⊗ S-23 PHASE 1 SAMPLING LOCATION & NUMBER
- ● N-14 PHASE 2 DEEP SAMPLING LOCATION & NUMBER
- ● N-6 PHASE 2 SHALLOW SAMPLING LOCATION & NUMBER
- — — APPROXIMATE AREAL EXTENT OF ELEVATED LEAD CONCENTRATIONS

SCALE IN FEET

0 15 30 60

Fina Oil & Chemical Company
Big Spring Refinery – Big Spring, Texas

RMT INC.

DWN. BY:	DWH
APPROVED BY:	R.R.P.
DATE:	4/9/98
PROJ. #	875-01858.32
FILE #	18583212

PLOT DATA
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Dwg Size:
Attached Xref's:

Alon USA, LP
Alon USA Big Spring Refinery
Big Spring, TX

Hazardous Waste Permit 50140 - Part B
Application SWR No. 30083 / RN100250869 / CN600881783

SECTION VII
TABLES

Table VII.A. - Unit Closure

For each unit to be permitted, list the facility components to be decontaminated, the possible methods of decontamination, and the possible methods of disposal of wastes and waste residues generated during unit closure:

Equipment or HWM Unit	Possible Methods of Decontamination[1]	Possible Methods of Disposal[1]
SITE H LTU	Steam Cleaning	Wastewater Treatment Unit
Tractor	Hydroblasting	Offsite Disposal
Disk Harrow		
Decon Pad		
CONTAINER STORAGE AREA	Steam Cleaning	Wastewater Treatment Unit
Concrete Slab	Hydroblasting	Offsite Disposal
Asphalt Surfaces		
Concrete Curbs		
Sump		

1. Applicants may list more than one appropriate method.

Table VII.B. - Unit Closure Cost Estimate

Task	Cost
CONTAINER STORAGE AREA:	
Dispose of Existing Inventory (assume maximum number of drums)	$140,000.00
Decontamination of CSA Structures and Disposal of Decontamination Wastes	$41,865.00
Demolition, Removal, and Disposal of CSA Structures	$2,764.00
Evaluation of Underlying Soils for Potential Contamination	$21,905.00
Potential Impacted Soils - Assume 5 cu yds	$4,151.00
Closure Certification	$22,271.00
Subtotal	$232,957.00
Contingency (10% minimum)	$23,296.00
Total Closure Cost Year 2023	$256,253.00

Supplement to TABLE VII.B
Breakdown of Estimate Development for
Itemized Closure Costs for CSA

A. DISPOSAL OF EXISTING INVENTORY ASSUME 100% (400 drums)

Removal of maximum inventory of waste drums with offsite disposal

Collection and Transportation^

# Units	Units	Cost	Per Unit	2013 Cost	2024 Cost	Ref
400	drums	$223	per drum	$89,200	**$119,002**	1

Offsite Disposal - Drummed Waste^

# Units	Units	Cost	Per Unit	2013 Cost	2024 Cost	Ref
400	drums	$105	per drum	$42,000	**$56,032**	2

Oversight and Supervision with Per Diem

# Units	Units	Cost	Per Unit	2013 Cost	2024 Cost	Ref
80	hours	$119	per hour	na	**$9,520**	4
10	days	$95	per day	na	**$950**	4

$185,504

B. DECONTAMINATION OF CSA STRUCTURES AND DISPOSAL OF DECONTAMINATION WASTES

Decontamination of asphalt/concrete slabs utilizing hydroblasting and sandblasting equipment and offsite disposal of decontamination wastes.

Hydroblasing^

# Units	Units	Cost	Per Unit	2013 Cost	2024 Cost	Ref
1200	sf	$1.74	per sf	$2,088	**$2,786**	1

Sandblasting^

# Units	Units	Cost	Per Unit	2013 Cost	2024 Cost	Ref
1200	sf	$2.34	per sf	$2,808	**$3,746**	1

Offsite Disposal - Sandblasting Sand^

# Units	Units	Cost	Per Unit	2013 Cost	2024 Cost	Ref
4	ton	$329.00	per ton	$1,316	**$1,756**	2

Offsite Disposal - Hydroblast Water^

# Units	Units	Cost	Per Unit	2013 Cost	2024 Cost	Ref
4500	gallons	$0.35	per gallon	$1,575	**$2,101**	2

Rinsate Sample Sampling and Analysis^

# Units	Units	Cost	Per Unit	2013 Cost	2024 Cost	Ref
6	samples	$1,040.00	per sample	$6,240	**$8,325**	6

Oversight and Supervision with Per Diem

# Units	Units	Cost	Per Unit	2013 Cost	2024 Cost	Ref
64	hours	$119	per hour	na	**$7,616**	4
8	days	$95	per day	na	**$760**	4

$27,089

Supplement to TABLE VII.B
Breakdown of Estimate Development for
Itemized Closure Costs for CSA

C. DEMOLITION, REMOVAL, AND DISPOSAL OF STRUCTURES

Demolition and removal of asphalt/concrete structures and offsite disposal of waste materials

Demolition - Asphalt^

# Units	Units	Cost	Per Unit	2013 Cost	2024 Cost	Ref
90	sy	$2.65	per sy	$239	**$318**	1

Demolition - Concrete^

# Units	Units	Cost	Per Unit	2013 Cost	2024 Cost	Ref
33	sy	$6.67	per sy	$220	**$294**	1

Removal^

# Units	Units	Cost	Per Unit	2013 Cost	2024 Cost	Ref
20	tons	$131.85	per sy	$2,637	**$3,518**	1

Disposal^

# Units	Units	Cost	Per Unit	2013 Cost	2024 Cost	Ref
20	tons	$219.08	per sy	$4,382	**$5,845**	2

Oversight and Supervision with Per Diem

# Units	Units	Cost	Per Unit	2013 Cost	2024 Cost	Ref
120	hours	$119	per hour	na	**$14,280**	4
15	days	$95	per day	na	**$1,425**	4

$25,680

D. EVALUATION OF UNDERLYING SOILS FOR POTENTIAL CONTAMINATION

Sampling and analysis across CSA site. Assume 8 locations

Soil Sampling^

# Units	Units	Cost	Per Unit	2013 Cost	2024 Cost	Ref
16	hrs	$125.00	labor	$2,000	**$2,668**	3

Soil Analysis

# Units	Units	Cost	Per Unit	2013 Cost	2024 Cost	Ref
8	samples	$1,010.00	per sample	$8,080	**$10,780**	6

Oversight and Supervision with Per Diem

# Units	Units	Cost	Per Unit	2013 Cost	2024 Cost	Ref
24	hours	$119	per hour	na	**$2,856**	4
3	days	$95	per day	na	**$285**	4

$16,589

Supplement to TABLE VII.B
Breakdown of Estimate Development for
Itemized Closure Costs for CSA

E. POTENTIAL IMPACTED SOILS

Excavation/removal and disposal of contaminated soils beneath the CSA (assume 5 cy of soils)

Soil Excavation^

# Units	Units	Cost	Per Unit	2013 Cost	2024 Cost	Ref
5	cy	$50.00	per cy	$250	**$334**	1

Soil Removal (1.2 tons/cy)^

# Units	Units	Cost	Per Unit	2013 Cost	2024 Cost	Ref
8	tons	$355.00	per ton	$2,840	**$3,789**	1

Offsite Disposal^

# Units	Units	Cost	Per Unit	2013 Cost	2024 Cost	Ref
4	samples	$208.00	per sample	$832	**$1,110**	2

Backfill

# Units	Units	Cost	Per Unit	2013 Cost	2024 Cost	Ref
5	cy	$18.25	per cy	$91	**$122**	1

Backfill Placement^

# Units	Units	Cost	Per Unit	2013 Cost	2024 Cost	Ref
5	cy	$10.50	per cy	$53	**$70**	1

Backfill Compaction^

# Units	Units	Cost	Per Unit	2013 Cost	2024 Cost	Ref
5	cy	$35.10	per cy	$176	**$234**	1

Oversight and Supervision with Per Diem

# Units	Units	Cost	Per Unit	2013 Cost	2024 Cost	Ref
80	hours	$119	per hour	na	**$9,520**	4
10	days	$95	per day	na	**$950**	4

$16,128

Supplement to TABLE VII.B
Breakdown of Estimate Development for
Itemized Closure Costs for CSA

F. CLOSURE CERTIFICATION

Development of report for submittal to TCEQ that presents a description of the closure activities performed at the CSA and includes a certification that the closure activites were conducted in accordance with the closure plan.

Project Technical

# Units	Units	Cost	Per Unit	2013 Cost	2024 Cost	Ref
50	hrs	$119.00	labor	$5,950	**$5,950**	4

Project Engineer

# Units	Units	Cost	Per Unit	2013 Cost	2024 Cost	Ref
40	hrs	$132.00	labor	$5,280	**$5,280**	4

Project Manager

# Units	Units	Cost	Per Unit	2013 Cost	2024 Cost	Ref
20	hrs	$158.00	labor	$3,160	**$3,160**	4

Miscellaneous

# Units	Units	Cost	Per Unit	2013 Cost	2024 Cost	Ref
1	lump sum	$500.00	na	$500	**$500**	4

$14,890

SUMMARY:

A.	**Disposal of Existing Inventory**	**$185,504**
B.	**Decontamination of CSA Structures and Disposal**	**$27,089**
C.	**Demolition, Removal, Disposa of Structures**	**$25,680**
D.	**Evaluation of Underlying Soils**	**$16,589**
E.	**Potential Impacted Soils**	**$16,128**
F.	**Closure Certification**	**$14,890**
	SUBTOTAL	**$285,881**
	10% CONTINGENCY	**$28,588**
	TOTAL	**$314,469**

NOTES:

^ - Includes third party labor and equipment

Costs developed for the 2013 Applicatioon as indicated

Costs developed for the 2024 Application by adjusting for the % annual inflaction rate from 2013 to 2023 as per the U.S. Department of Labor (USDL) annual inflation statistics

Published Annual Inflation Rates (USDL)	**2014**	**2015**	**2016**	**2017**	**2018**
	0.8%	**0.7%**	**2.1%**	**2.1%**	**1.9%**
	2019	**2020**	**2021**	**2022**	**2023**
	2.3%	**1.4%**	**7.0%**	**6.5%**	**3.4%**

Used 2013 cost X 1.3341 for 10-year inflation

REFERENCES

1 - Means Heavy Construction Cost Data, 12th Edition
2 - 2013 Disposal Costs - WCS Landfill
3 - Based on 2013 RMT, Inc. Labor Costs
4 - Based on 2024 Atlas Technical Consultants Labor Rates
5 - 2013 Environmental Drilling Services Rates
6 - 2013 Epic Laboratory Analytical Rates

Table VII.C.5. - Land-Based Units Closed Under Interim Status

N.O.R.Unit No.	Unit Description [1, 2]	Date of Receipt of Last Waste[3]	Date of Closure Certification[3]
RESERVED	No Interim Status Closures		

1. Indicates a unit for which a 40 CFR 264 closure equivalency determination has been requested pursuant to 40 CFR 270.1(c)(5).
2. Indicates a unit for which a 40 CFR 264 closure equivalency determination has been made pursuant to 40 CFR 270.1(c)(6).
3. Enter month, day, and year.

Table VII.D. - Unit Post-Closure Cost Estimate

Task	Cost
SITE E LAND TREATMENT UNIT [Annual Costs]	
Quarterly Inspection	$1,476.00
Cover System Repairs	$2,636.00
Semiannual Groundwater Monitoring	$17,713.00
Miscellaneous Administrative Costs	$722.00
Other tasks (such as labor, lab analysis, transportation, certifications, etc.)	
Other tasks	
Subtotal	$22,547.00
Contingency (10% minimum)	$2,255.00
Year(s) of Post-Closure	2
Total Unit Closure Cost (Annual Cost X Years of Post-Closure) Year 2	$49,604.00
Task	Cost
SITE H LAND TREATMENT UNIT [Annual Costs]:	
Quarterly Insptections	$1,476.00
Cover System Repairs	$1,713.00
Annual Soil-Pore Liquid Monitoring (assumes 0 Potential SSIs)	$4,323.00
Annual Soil-Core Monitoring (assumes 2 Potential SSIs)	$18,199.00
Annual Groundwater Monitoring (assumes 2 Potential SSIs)	$18,978.00
Miscellaneous Administrative Costs	$928.00
Subtotal	$45,617.00
Contingency (10% minimum)	$4,562.00

Task		Cost
Year(s) of Post-Closure		10
Total Unit Closure Cost (Annual Cost X Years of Post-Closure)	Year 10	$501,790.00

The estimates listed above were derived from the following sources:
Utilized the detailed costs from the last permit renewal and adjusted unit costs using the U.S. Bureau of Labor Statistics Annual Inflation rates
2014 = +0.8% 2015 = +0.7% 2016 = +2.1% 2017 = +2.1% 2018 = +1.9%
2019 = +2.3% 2020 = +1.4% 2021 = +7.0% 2022 = +6.5% 2023 = +3.4%

Costs either from 2023 actual costs or Original 2013 values were as follows:
Labor - RMT, Inc. Austin, TX facility's environmental consultant
Sample Analsys - Epic Laboratories - Austin, TX
Earthwork - Means Heavy Construction Cost Data (12th Edition)

Table VII.E.1. - Permitted Unit Closure Cost Summary

Existing Unit Closure Cost Estimate	
Unit	Cost
Container Storage Area	$314,469.00
Site E LTU [IN POST-CLOSURE]	$0.00
Site H LTU [IN POST-CLOSURE]	$0.00
Total Existing Unit Closure Cost Estimate[1] Year 2023	$314,469.00

Proposed Unit Closure Cost Estimate	
Unit	Cost
Total Proposed Unit Closure Cost Estimate Footnote	

1 As units are added or deleted from these tables through future permit amendments or modifications, the remaining itemized unit costs should be updated for inflation when re-calculating the revised total cost in current dollars.

Table VII.E.2. - Permitted Unit Post-Closure Cost Summary

Existing Unit Closure Cost Estimate	
Unit	Cost
Site E Land Treatment Unit	$744,030.00
Site H Land Treatment Unit	$1,075,230.00
Container Storage Area [PLANNED CLEAN CLOSURE]	$0.00
Total Existing Unit Post-Closure Cost Estimate[1]	$1,819,260.00

Proposed Unit Post-Closure Cost Estimate	
Unit	Cost
Total Proposed Unit Post-Closure Cost Estimate	

1. As units are added or deleted from these tables through future permit amendments or modifications, the remaining itemized unit costs should be updated for inflation when re-calculating the revised total cost in current dollars.

Alon USA, LP
Alon USA Big Spring Refinery
Big Spring, TX

Hazardous Waste Permit 50140
Part B Application
SWR No. 30083 / RN100250869 / CN600881783

SECTION VIII
FINANCIAL ASSURANCE

VIII. Financial Assurance

Provide all Part B responsive information in Appendix VI. When preparing the physical format organize your submittal using the Format of Hazardous Waste permit Application and Instructions.

A. Financial Assurance Information Requirements for all Applicants (30 TAC Chapter 37, Subchapter P, 305.50(a)(4)(A-E), 335.152(a)(6) and 335.179)

1. Financial Assurance for Closure

An owner or operator must establish financial assurance for the closure of the facility no later than 60 days prior to the first receipt of waste [30 TAC Section 37.31(a)]. Please refer to 30 TAC Chapter 37, Subchapter P, for the financial assurance requirements for closure and provide a signed statement from an authorized signatory per 30 TAC 305.44 regarding how the owner or operator will comply with this provision.

If a financial mechanism has been obtained, provide a copy of the mechanism.

For applications involving a permit transfer, the new owner or operator must provide a financial assurance mechanism (in original form) satisfactory to the TCEQ executive director. Prior to the executive director issuing the permit modification transferring the permit, the new owner or operator must provide proof of financial assurance in compliance with 30 TAC Section 305.64 (g) and Chapter 37, Subchapter P.

2. Financial Assurance for Post-Closure Care (applicable to disposal facilities and contingent post-closure care facilities only)

An owner or operator subject to post-closure monitoring or maintenance requirements must establish financial assurance for the post-closure care of the facility no later than 60 days prior to the first receipt of waste [30 TAC Section 37.31(a)]. Please refer to 30 TAC Chapter 37, Subchapter P for the financial assurance requirements for post-closure and provide a signed statement from an authorized signatory per 30 TAC 305.44 regarding how the owner or operator will comply with this provision.

If a financial mechanism has been obtained, provide a copy of the mechanism.

For applications involving a permit transfer, the new owner or operator must provide a financial assurance mechanism (in original form) satisfactory to the TCEQ executive director. Prior to the executive director issuing the permit modification transferring the permit, the new owner or operator must provide proof of financial assurance in compliance with 30 TAC Section 305.64 (g) and Chapter 37, Subchapter P.

3. Financial Assurance for Corrective Action

An owner or operator must establish financial assurance for corrective action of the facility no later than 60 days after the permit or order requiring the corrective action financial assurance is signed by the executive director or commission [30 TAC Section 37.31(b)]. Please refer to 30 TAC Chapter 37, Subchapter P, for the financial assurance requirements for closure and provide a signed statement from an authorized signatory per 30 TAC 305.44 regarding how the owner or operator will comply with this provision and indicate below the type of financial assurance mechanism to cover corrective action for the

ity.

If a financial mechanism has been obtained, provide a copy of the mechanism.

For applications involving permit transfers, the new owner or operator must provide a financial assurance mechanism (in original form) satisfactory to the TCEQ executive director. Prior to the executive director issuing the permit modification transferring the permit, the new owner or operator must provide proof of financial assurance in compliance with 30 TAC Section 305.64 (g) and Chapter 37, Subchapter P.

4. Liability Requirements (not required for post-closure care)

All owners or operators must establish financial assurance for third party sudden liability coverage of the facility no later than 60 days prior to the first receipt of waste [30 TAC Section 37.31(a)]. Owners or operators of disposal facilities must establish financial assurance for third party sudden and nonsudden liability coverage of the facility no later than 60 days prior to the first receipt of hazardous waste. Please refer to 30 TAC Chapter 37, Subchapter P, for the financial assurance requirements for liability coverage, and provide a signed statement from an authorized signatory per 30 TAC 305.44 regarding how the owner or operator will comply with this provision.

If a financial mechanism has been obtained, provide a copy of the mechanism.

For applications involving a permit transfer, the new owner or operator must provide a financial assurance mechanism (in original form) satisfactory to the TCEQ executive director. Prior to the executive director issuing the permit modification transferring the permit, the new owner or operator must provide proof of financial assurance in compliance with 30 TAC Section 305.64 (g) and Chapter 37, Subchapter P.

B. Applicant Financial Disclosure Statements for a new permit, permit amendment, or permit modification, or permit renewal (30 TAC 305.50(a)(4))

Refer to the Supplemental Technical Information Guidance for Applicants Subject to Financial Capability Requirements, included in Section VIII.B., and the requirements listed below as you complete this section.

1. Provide information required in 30 TAC 305.50(a)(4), as applicable to the application request.

2. Complete Table VIII.B. if requesting capacity expansion or new construction.

3. For new commercial hazardous waste management facility applications, a written statement signed by an authorized signatory per 30 TAC 305.44 explaining how the applicant intends to provide emergency response financial assurance per 30 TAC 305.50(a)(12)(C) or (D).

RESERVED

4. For renewal applications with no capacity expansion, please complete and submit the attached Financial Disclosure Letter.

Information for Applicants Subject to Financial Capability Requirements

Certain applications involving Hazardous Waste facilities are subject to review of the applicant's financial ability to construct, operate, and/or close the facility, perform post-closure

care and corrective action at the facility in accordance with State law as specified in Section 361.085 of the Texas Health and Safety Code. TCEQ refers to these reviews as financial capability reviews. This document summarizes and clarifies the information required in an application to meet the TCEQ requirements of 30 Texas Administrative Code (TAC) 305.50.

Information requirements vary depending on the type of financial information available to applicants, primarily whether audited financial statements are available as well as the type of application submitted. For each scenario described below, financial information must be provided for the specific applicant.

I. New Facilities, Facility Expansions and Permit Transfers

1. Publicly traded Entities

    1. Securities and Exchange Commission (SEC) Form 10-Ks

        This portion of the requirement calls for the two most recent 10-K reports filed.

    1. SEC Form 10-Q

        This portion of the requirement calls for a copy of the most recent quarterly report.

        1. Explanation statement

            This portion of the requirement calls for a statement signed by an authorized signatory [as described in 30 TAC 305.44(a)] explaining in detail how the applicant demonstrates sufficient financial resources to construct, safely operate, properly close, perform post-closure care, perform corrective action and provide adequate liability coverage for the facility. This statement must also address how the closure, post-closure, corrective action, and liability coverage financial assurance requirements of Chapter 37, Subchapter P will be met. (ie. which financial assurance mechanism is or will be used).

    1. Construction capital cost estimates

        This portion of the requirement calls for estimates of capital costs for expansion and/or initial construction if the application encompasses facility expansion, capacity expansion, or new construction.

1. Privately held entities with audited financial statements

    1. Audited financial statements

        This portion of the requirement calls for complete copies of the audited financial statements for each of the most recent two fiscal years. If an audit has not been completed for one of the previous two years, a complete copy of the fiscal year end financial statement and federal tax return may be substituted in lieu of the audit not performed. The tax return must be certified by original signature of an authorized signatory as being a "true and correct copy of the return filed with the Internal Revenue Service." Financial statements must be prepared consistent with generally accepted accounting principles and include a balance sheet, income statement, cash flow statement, notes to the financial statement, and an accountant's opinion letter.

1. Quarterly financial statement

This portion of the requirement calls for a complete copy of the most current quarterly financial statement prepared consistent with generally accepted accounting principles. Internally prepared statements are satisfactory.

1. Supplementary information statement

This portion of the requirement calls for a written statement detailing the information that would normally be found in SEC's Form 10-K including descriptions of the business and its operations; identification of any affiliated relationships; credit agreements and terms; any legal proceedings involving the applicant; contingent liabilities; and significant accounting policies.

1. Construction capital cost estimates

This portion of the requirement calls for estimates of capital costs for expansion and/or initial construction if the application encompasses facility expansion, capacity expansion, or new construction.

1. Explanation statement

This portion of the requirement calls for a statement signed by an authorized signatory [as described in 30 TAC 305.44(a)] explaining in detail how the applicant demonstrates sufficient financial resources to construct, safely operate, properly close, perform post-closure care, perform corrective action and provide adequate liability coverage for the facility. This statement must also address how the closure, post-closure, corrective action, and liability coverage financial assurance requirements of Chapter 37, Subchapter P will be met (ie. which financial assurance mechanism is or will be used).

1. Entities without audited financial statements or entities choosing not to provide the information listed above

1. Financial Plan

This portion of the requirement calls for a financial plan (including balance sheets listing assets, liabilities and capital accounts) sufficiently detailed to clearly demonstrate that the applicant will be in a position to readily secure financing for construction, operation, and closure, post-closure, and corrective action if the permit is issued. At least 3 balance sheets should be included as of: a) approximately the date of the permit application, b) 12 months after any construction is completed (or assumption of operational control for a permit transfer), and c) 24 months after any construction is completed (or assumption of operational control for a permit transfer).

1. Letters of opinion

   The submitted financial plan must be accompanied by original letters of opinion from two financial experts, not otherwise employed by the applicant, who have the demonstrated ability to either finance the facility or place the required financing. If the permit action sought involves construction of a new facility or expansion of an existing facility, the opinion letters must certify that financing is obtainable within 180 days of permit approval and include the time schedule contingent upon permit finality for securing the financing as well as certify the financial plan is reasonable. Even if the application does not involve a facility or capacity expansion, the opinion letters must certify that the financial plan is reasonable. Only one opinion letter from a financial expert, not otherwise employed by the applicant, is required if the letter renders a firm commitment to provide all the necessary financing.

   Letters of opinion are usually issued by investment or commercial bankers but there could be additional sources. Applicants are encouraged to verify the adequacy of the credentials of their chosen financial expert with TCEQ's financial assurance unit prior to a formal engagement. Financial experts should describe their qualifications and disclose their independence from the applicant and/or any entity or person affiliated with the applicant.

1. Operating and cash flow statement

   This portion of the requirement calls for a written detail of the annual operating costs of the facility and a projected cash flow statement including the period of construction and first two years of operation. The cash flow statement must demonstrate the financial resources to meet operating costs, debt service, and provide financial assurance for closure, post-closure care, and liability coverage requirements. A list of the assumptions made to forecast cash flow must also be provided.

1. Explanation statement

   This portion of the requirement calls for a statement addressing how the closure, post-closure, corrective action, and liability coverage financial assurance requirements of Chapter 37, Subchapter P will be met (ie. which financial assurance mechanism is or will be used).

1. Construction capital cost estimates

   This portion of the requirement calls for estimates of capital costs for expansion and/or initial construction if the application encompasses facility expansion, capacity expansion, or new construction.

1. Entities with a resolution from a governing body approving or agreeing to approve the issuance of bonds to satisfy financial assurance requirements (e.g. a city or county)

1. Explanation statement

   This portion of the requirement calls for a statement signed by an authorized signatory [as described in 30 TAC30 305.44(a)] explaining in detail how the applicant demonstrates sufficient financial resources to construct, safely operate, properly close, perform post-closure, perform corrective action and provide adequate liability coverage for the facility. This statement must also address how the closure, post-closure, corrective action, and liability coverage

nancial assurance requirements of Chapter 37, Subchapter P will be met (ie. which financial assurance mechanism is or will be used).

1. Certified copy of the resolution from the governing body.

1. Certification by the governing body of passage of the resolution.

II. Permit Renewals

Complete the **Financial Disclosure Letter** letter with applicable information inserted into the parentheses. *Note that additional information must be provided if requested by TCEQ.*

Alon USA, LP
Alon USA Big Spring Refinery
Big Spring, TX

Hazardous Waste Permit 50140
Part B Application
SWR No. 30083 / RN100250869 / CN600881783

APPENDIX VIII
APPLICATION RESPONSES
Financial Assurance

Alon USA, LP
Alon USA Big Spring Refinery
Big Spring, TX

Hazardous Waste Permit 50140
Part B Application
SWR No. 30083 / RN100250869 /
CN600881783

SECTION VII
APPENDIX VIII-A
FINANCIAL ASSURANCE

Sheree L. Newell
Legal Assistant

March 31, 1998

Via Federal Express
USA Airbill No.: 4861459234

Mr. Rob Norris
Administrator, Financial Assurance Section
Texas Natural Resource Conservation commission
12100 Park 35 Circle
3rd Floor, Bldg. A
MC: 184
Austin, Texas 78753

Re: ***Texas Financial Assurance Documents for Fina Inc.***

Dear Mr. Norris:

Enclosed please find the following information:

1. FINA, Inc.'s financial assurance letters and guarantees on behalf of Fina Oil and Chemical Company's TXD008013468, TXD065099160 and TXD086981172;

2. KPMG's Independent Accountants' Report on Applying Agreed-Upon Procedures; and

3. FINA, Inc.'s Annual Report

Please feel free to contact me at (214) 890-1179 if you have any questions and/or need any additional information.

Cordially,

Sheree L. Newell

Enclosures

FINA, Inc.
Post Office Box 2159
Dallas, Texas 75221
(214) 750-2400

March 31, 1998

VIA FEDERAL EXPESS

Mr. Rob Norris
Administrator, Financial Assurance Section
Texas Natural Resource Conservation Commission
P.O. Box 13087
Capitol Station
Austin, Texas 78711-3087

Re: TXD008013468, TXD065099160, and TXD086981172
Financial Responsibility for Liability Coverage, Closure, and Post-Closure Care

Dear Mr. Norris:

I am the Chief Financial Officer of FINA, Inc., Dallas, Texas. This letter is in support of the use of the financial test to demonstrate financial responsibility for liability coverage and closure and post-closure care as specified in subpart H of 40 CFR parts 264 and 265.

The firm identified above is the owner or operator of the following facilities for which liability coverage for both sudden and nonsudden accidental occurrences is being demonstrated through the financial test specified in subpart H of 40 CFR parts 264 and 265:

NONE

The firm identified above guarantees, through the guarantee specified in subpart H of 40 CFR parts 264 and 265, liability coverage for both sudden and nonsudden accidental occurrences at the following facilities owned or operated by the following:

Fina Oil and Chemical Company	Fina Oil and Chemical Company	Fina Oil and Chemical Company
TXD008013468	TXD065099160	TXD086981172
Big Spring Refinery	Port Arthur Refinery	La Porte Plant
P.O. Box 1311	P.O. Box 849	P.O. Box 888
Big Spring, Texas 79720	Port Arthur, Texas 77640	Deer Park, TX 77536

The firm identified above is the direct or higher-tier parent corporation of the owner or operator.

1. The firm identified above owns or operates the following facilities for which financial assurance for closure or post-closure care or liability coverage is demonstrated through the financial test specified in subpart H of 40 CFR parts 264 and 265. The current closure and/or post-closure cost estimate covered by the test are shown for each facility:

NONE

2. The firm identified above guarantees, through the guarantee specified in subpart H of 40 CFR parts 264 and 265, the closure and post-closure care or liability coverage of the following facilities owned or operated by the guaranteed party. The current cost estimates for the closure or post-closure care so guaranteed are shown for each facility:

Fina Oil and Chemical Company TXD008013468 Big Spring Refinery P.O. Box 1311 Big Spring, Texas 79720	Fina Oil and Chemical Company TXD065099160 Port Arthur Refinery P.O. Box 849 Port Arthur, Texas 77640	Fina Oil and Chemical Company TXD086981172 La Porte Plant P.O. Box 888 Deer Park, TX 77536
Closure Cost .....$ 323,626 Post-Closure Cost.....$1,361,257 Corrective Action.....$1,512,000	Closure Cost ..... $9,220,799 Post-Closure Cost.... $2,046,894	Closure Cost ..... $ 348,416 Post-Closure Cost.... $ -0-

3. In States where EPA is not administering the financial requirements of subpart H of 40 CFR parts 264 and 265, this firm is demonstrating financial assurance for the closure or post-closure care of the following facilities through the use of a test equivalent or substantially equivalent to the financial test specified in subpart H or 40 CFR parts 264 and 265. The current closure or post-closure cost estimates covered by such a test are shown for each facility:

NONE

4. The firm identified above owns or operates the following hazardous waste management facilities for which financial assurance for closure or, if a disposal facility, post-closure care, is not demonstrated either to EPA or a State through the financial test or any other financial assurance mechanisms specified in subpart H of 40 CFR parts 264 and 265 or equivalent or substantially equivalent State mechanisms. The current closure and/or post-closure cost estimates not covered by such financial assurance are shown for each facility:

NONE

5. This firm is the owner or operator or guarantor of the following UIC facilities for which financial assurance for plugging and abandonment is required under part 144 and is assured through a financial test. The current closure cost estimates as required by 40 CFR 144.62 are shown for each facility:

NONE

This firm is required to file a Form 10K with the Securities and Exchange Commission (SEC) for the latest fiscal year.

The fiscal year of this firm ends on December 31. The figures for the following items marked with an asterisk are derived from this firm's independently audited, year-end financial statements for the latest completed fiscal year, ended December 31, 1997.

ALTERNATIVE I

1.	Sum of current closure and post-closure cost estimates (total of all cost estimates listed above.) [Includes corrective action amount $1,512,000]	$ 14,812,992
2.	Amount of annual aggregate liability coverage to be demonstrated	$ 8,000,000
3.	Sum of lines 1 and 2	$ 22,812,992
*4.	Total liabilities	$1,737, 562,000
*5.	Tangible net worth	$1,248,956,000
*6.	Net worth	$1,277,112,000
*7.	Current assets	$ 975,962,000
*8.	Current liabilities	$ 826,947,000
*9.	Net working capital	$ 149,015,000
*10.	The sum of net income plus depreciation, depletion, and amortization	$ 328,255,000
*11.	Total Assets in U.S	N/A

		YES	NO
12.	Is line 5 at least $10 million?	X	___
13.	Is line 5 at least 6 times line 3?	X	___
14.	Is line 9 at least 6 times line 3?	X	___
*15.	Are at least 90% of assets located in the U.S.?	X	___
16.	Is line 11 at least 6 times line 3?	N/A	___
17.	Is line 4 divided by line 6 less than 2.0?	X	___
18.	Is line 10 divided by line 4 greater than 0.1?	X	___
19.	Is line 7 divided by line 8 greater than 1.5?	___	X

I hereby certify that the wording of this letter is identical to the wording specified in 40 CFR 264.151(g) as such regulations were constituted on the date shown immediately below.

Very truly yours,

Linda Middleton

Linda Middleton, Secretary, for
Geoffroy Petit
Vice President and Chief Financial Officer

CORPORATE GUARANTEE FOR CLOSURE OR POST-CLOSURE CARE

Guarantee made this 31st day of March, 1998, by FINA, Inc., a business corporation organized under the laws of the State of Delaware, herein referred to as guarantor. This guarantee is made on behalf of Fina Oil and Chemical Company, 8350 North Central Expressway, Dallas, Texas, which is our subsidiary, to the Texas Natural Resource Conservation Commission (TNRCC).

RECITALS

1. Guarantor meets or exceeds the financial test criteria and agrees to comply with the reporting requirements for guarantors as specified in 40 CFR 264.143(f), 264.145(f), 265.143(e), and 265.145(e).

2. Fina Oil and Chemical Company owns or operates the following hazardous waste management facilities covered by this guarantee for closure and post-closure care:

TXD008013468	TXD065099160	TXD086981172
Big Spring Refinery	Port Arthur Refinery	La Porte Plant
P.O. Box 1311	P.O. Box 849	P.O. Box 888
Big Spring, Texas 79720	Port Arthur, Texas 77640	Deer Park, TX 77536

3. "Closure plans" and "post-closure plans" as used below refer to the plans maintained as required by subpart G of 40 CFR parts 264 and 265 for the closure and post-closure care of facilities as identified above.

4. For value received from Fina Oil and Chemical Company, guarantor guarantees to TNRCC that in the event that Fina Oil and Chemical Company fails to perform closure and post-closure care of the above facilities in accordance with the closure or post-closure plans and other permit or interim status requirements whenever required to do so, the guarantor shall do so or establish a trust fund as specified in subpart H of 40 CFR part 264 or 265, as applicable, in the name of Fina Oil and Chemical Company in the amount of the current closure or post-closure cost estimates as specified in subpart H of 40 CFR parts 264 and 265.

5. Guarantor agrees that if, at the end of any fiscal year before termination of this guarantee, the guarantor fails to meet the financial test criteria, guarantor shall send within 90 days, by certified mail, notice to the TNRCC Executive Director for the Region in which the facilities are located and to Fina Oil and Chemical Company that he intends to provide alternate financial assurance as specified in subpart H of 40 CFR part 264 or 265, as applicable, in the name of Fina Oil and Chemical Company. Within 120 days after the end of such fiscal year, the guarantor shall establish such financial assurance unless Fina Oil and Chemical Company has done so.

6. The guarantor agrees to notify the TNRCC Executive Director by certified mail, of a voluntary or involuntary proceeding under Title 11 (Bankruptcy, U.S. Code, naming guarantor as debtor, within 10 days after commencement of the proceeding.

7. Guarantor agrees that within 30 days after being notified by the TNRCC Executive Director of a determination that guarantor no longer meets the financial test criteria or that he is disallowed from continuing as a guarantor of closure or post-closure care, he shall establish alternate financial assurance as specified in subpart H of 40 CFR part 264 or 265, as applicable, in the name of Fina Oil and Chemical Company unless Fina Oil and Chemical Company has done so.

8. Guarantor agrees to remain bound under this guarantee notwithstanding any or all of the following: amendment or modification of the closure or post-closure plan, amendment or modification of the permit, the extension or reduction of the time of performance of closure or post-closure, or any other modification or alteration of an obligation of the owner or operator pursuant to 40 CFR part 264 or 265.

9. Guarantor agrees to remain bound under this guarantee for as long as Fina Oil and Chemical Company must comply with the applicable financial assurance requirements of subpart H of 40 CFR parts 264 and 265 for the above-listed facilities, except as provided in paragraph 10 of this agreement.

10. Guarantor may terminate this guarantee by sending notice by certified mail to the TNRCC Executive Director for the Region in which the facilities are located and to Fina Oil and Chemical Company, provided that this guarantee may not be terminated unless and until Fina Oil and Chemical Company obtains, and the TNRCC Executive Director approves, alternate closure and/or post-closure care coverage complying with 40 CFR 264.143, 264.145, 265.143 and/or 265.145.

11. Guarantor agrees to that if Fina Oil and Chemical Company fails to provide alternate financial assurance as specified in subpart H of 40 CFR part 264 or 265, as applicable, and obtain written approval of such assurance from the TNRCC Executive Director within 90 days after a notice of cancellation by the guarantor is received by a TNRCC Executive Director from guarantor, guarantor shall provide such alternate financial assurance in the name of Fina Oil and Chemical Company.

12. Guarantor expressly waives notice of acceptance of this guarantee by the TNRCC or by Fina Oil and Chemical Company. Guarantor also expressly waives notice of amendments or modifications of the closure and/or post-closure plan and of amendments or modification of the facility permit(s).

I hereby certify that the wording of this guarantee is identical to the wording specified in 40 CFR 264.151(h) as such regulations were constituted on the date first above written.

Effective date: March 31, 1998

FINA, Inc.
Name of Guarantor

Linda Middleton
Authorized Signature

Linda Middleton, Secretary, for
Geoffroy Petit
Vice President and Chief Financial Officer

Signature of Witness or Notary

GUARANTEE FOR LIABILITY COVERAGE

Guarantee made this 31st day of March, 1998 , by FINA, Inc., a business corporation organized under the laws of the State of Delaware, herein referred to as guarantor. This guarantee is made on behalf of our subsidiary Fina Oil and Chemical Company of Dallas, Texas, to any and all third parties who have sustained or may sustain bodily injury or property damage caused by sudden and nonsudden accidental occurrences arising from operation of the facilities covered by this guarantee.

RECITALS

1. Guarantor meets or exceeds the financial test criteria and agrees to comply with the reporting requirements for guarantors as specified in 40 CFR 264.147(g) and 265.147(g).

2. Fina Oil and Chemical Company owns or operates the following hazardous waste management facilities covered by this guarantee:

TXD008013468	TXD065099160	TXD086981172
Big Spring Refinery	Port Arthur Refinery	La Porte Plant
P.O. Box 1311	P.O. Box 849	P.O. Box 888
Big Spring, Texas 79720	Port Arthur, Texas 77640	Deer Park, TX 77536

This corporate guarantee satisfies RCRA third-party liability requirements for both sudden and nonsudden accidental occurrences in above-named owner or operator facilities for coverage in the amount of $4,000,000 for each occurrence and $8,000,000 annual aggregate.

3. For value received from Fina Oil and Chemical Company, guarantor guarantees to any and all third parties who have sustained or may sustain bodily injury or property damage caused by sudden and nonsudden accidental occurrences arising from operations of the facilities covered by this guarantee that in the event that Fina Oil and Chemical Company fails to satisfy a judgment or award based on a determination of liability for bodily injury or property damage to third parties caused by sudden and nonsudden accidental occurrences arising from the operation of the above-named facilities, or fails to pay an amount agreed to in settlement of a claim arising from or alleged to arise from such injury or damage, the guarantor will satisfy such judgment(s), award(s) or settlement agreement(s) up to the limits of coverage identified above.

4. Such obligation does not apply to any of the following:

(a) Bodily injury or property damage for which Fina Oil and Chemical Company is obligated to pay damages by reason of the assumption of liability in a contract or agreement. This exclusion does not apply to liability for damages that Fina Oil and Chemical Company would be obligated to pay in the absence of the contract or agreement.

(b) Any obligation of Fina Oil and Chemical Company under a workers' compensation, disability benefits, or unemployment compensation law or any similar law.

(c) Bodily injury to:

(1) An employee of Fina Oil and Chemical Company arising from, and in the course of, employment by Fina Oil and Chemical Company; or

(2) The spouse, child, parent, brother, or sister of that employee as a consequence of, or arising from, and in the course of employment by Fina Oil and Chemical Company. This exclusion applies:

(A) Whether Fina Oil and Chemical Company may be liable as an employer or in any other capacity; and

(B) To any obligation to share damages with or repay another person who must pay damages because of the injury to persons identified in paragraphs (1) and (2).

(d) Bodily injury or property damage arising out of the ownership, maintenance, use, or entrustment to others of any aircraft, motor vehicle or watercraft.

(e) Property damage to:

(1) Any property owned, rented, or occupied by Fina Oil and Chemical Company;

(2) Premises that are sold, given away or abandoned by Fina Oil and Chemical Company if the property damage arises out of any part of those premises;

(3) Property loaned to Fina Oil and Chemical Company;

(4) Personal property in the care, custody or control of Fina Oil and Chemical Company;

(5) That particular part of real property on which Fina Oil and Chemical Company or any contractors or subcontractors working directly or indirectly on behalf of Fina Oil and Chemical Company are performing operations, if the property damage arises out of these operations.

5. Guarantor agrees that if, at the end of any fiscal year before termination of this guarantee, the guarantor fails to meet the financial test criteria, guarantor shall send within 90 days, by certified mail, notice to the TNRCC Executive Director for the Region in which the facility is located and to Fina Oil and Chemical Company that he intends to provide alternate liability coverage as specified in 40 CFR 264.147 and 265.147, as applicable, in the name of Fina Oil and Chemical Company. Within 120 days after the end of such fiscal year, the guarantor shall establish such liability coverage unless Fina Oil and Chemical Company has done so.

6. The guarantor agrees to notify the TNRCC Executive Director by certified mail of a voluntary or involuntary proceeding under title 11 (Bankruptcy), U.S. Code, naming guarantor as debtor, within 10 days after commencement of the proceeding.

7. Guarantor agrees that within 30 days after being notified by the TNRCC Executive Director of a determination that guarantor no longer meets the financial test criteria or that he is disallowed from continuing as a guarantor, he shall establish alternate liability coverage as

specified in 40 CFR 264.147 or 265.147 in the name of Fina Oil and Chemical Company, unless Fina Oil and Chemical Company has done so.

8. Guarantor reserves the right to modify this agreement to take into account amendment or modification of the liability requirements set by 40 CFR 264.147 and 265.147, provided that such modification shall become effective only if the Executive Director does not disapprove the modification within 30 days of receipt of notification of the modification.

9. Guarantor agrees to remain bound under this guarantee for so long as Fina Oil and Chemical Company must comply with the applicable requirements of 40 CFR 264.147 and 265.147 for the above-listed facilities, except as provided in paragraph 10 of this agreement.

10. Guarantor may terminate this guarantee by sending notice by certified mail to the TNRCC Executive Director for the Region in which the facility is located and to Fina Oil and Chemical Company, provided that this guarantee may not be terminated unless and until Fina Oil and Chemical Company obtains, and the TNRCC Executive Director approves, alternate liability coverage complying with 40 CFR 264.147 and/or 265.147.

11. Guarantor hereby expressly waives notice of acceptance of this guarantee by any party.

12. Guarantor agrees that this guarantee is in addition to and does not affect any other responsibility or liability of the guarantor with respect to the covered facilities.

13. The Guarantor shall satisfy a third-party liability claim only on receipt of one of the following documents:

(a) Certification from the Principal and the third-party claimant(s) that the liability claim should be paid. The certification must be worded as follows, except that instructions in brackets are to be replaced with the relevant information and the brackets deleted:

CERTIFICATION OF VALID CLAIM

The undersigned, as parties [insert Principal] and [insert name and address of third-party claimants(s)], hereby certify that the claim of bodily injury and/or property damage caused by a [sudden or nonsudden] accidental occurrence arising from operating [Principal's] hazardous waste treatment, storage, or disposal facility should be paid in the amount of $_____.

[Signatures]_____
Principal_____

(Notary) Date _____

[Signatures]_____
Principal_____

(Notary) Date _____

(b) A valid final court order establishing a judgment against the Principal for bodily injury or property damage caused by sudden or nonsudden accidental occurrences arising from the operation of the Principal's facility or group of facilities.

14. In the event of combination of this guarantee with another mechanism to meet liability requirements, this guarantee will be considered primary coverage.

I hereby certify that the wording of the guarantee is identical to the wording specified in 40 CFR 264.151(h)(2) as such regulations were constituted on the date shown immediately below.

Effective date: March 31, 1998

FINA, Inc.
Name of Guarantor

Linda Middleton
Authorized Signature

Linda Middleton, Secretary, for
Geoffroy Petit
Vice President and Chief Financial Officer

Signature of Witness or Notary

KPMG Peat Marwick LLP

200 Crescent Court
Suite 300
Dallas, TX 75201-1885

INDEPENDENT ACCOUNTANTS' REPORT
ON APPLYING AGREED-UPON PROCEDURES

The Board of Directors
FINA, Inc.:

Under date of January 26, 1998, except as to the third paragraph of Note 1(a) which is as of February 17, 1998, we reported on the consolidated financial statements ("Consolidated Financial Statements") of FINA, Inc. and subsidiaries (the "Company") as of December 31, 1997 and 1996, and for each of the years in the three-year period ended December 31, 1997 and supplementary consolidating information of the Company for the year ended December 31, 1997 and rendered our unqualified opinion thereon. Our report refers to a change in the method of accounting for long-lived assets in 1995. Our audit was made for the purpose of forming an opinion on the Consolidated Financial Statements taken as a whole. The consolidating information (Schedules 1 and 2) is presented for purposes of additional analysis of the Consolidated Financial Statements rather than to present the financial position and results of operations of the individual companies. This report should not be regarded as in any way updating the aforementioned report.

We have performed the procedures enumerated below, which were agreed to by the Texas Natural Resource Conservation Commission and FINA, Inc., solely to assist you in connection with the demonstration of financial responsibility for liability coverage and closure and post-closure care to the Texas Natural Resource Conservation Commission. This engagement to apply agreed-upon procedures was performed in accordance with standards established by the American Institute of Certified Public Accountants. The sufficiency of the procedures is solely the responsibility of the specified users of the report. Consequently, we make no representation regarding the sufficiency of the procedures described below either for the purpose for which this report has been requested or for any other purpose.

- We read the letter dated March 31, 1998, from Geoffroy Petit, Vice President and Chief Financial Officer of FINA, Inc., to the Texas Natural Resource Conservation Commission, regarding demonstration of financial responsibility for liability coverage and closure and post-closure care by FINA, Inc.

- We compared the amount ($1,737,562,000) of "total liabilities" on line 4 of page 3 of the letter referred to above with an amount derived from the Consolidated Financial Statements by subtracting "total stockholders' equity" of $1,277,112,000 from "liabilities and stockholders' equity" of $3,014,674,000 and found them to be in agreement.

- We obtained a schedule prepared by the Company showing intangible assets ($28,156,000) and agreed such amounts the Company's December 31, 1997 general ledger. We recomputed the amount ($1,248,956,000) of "tangible net worth" on line 5 of page 3 of the letter referred to above by subtracting intangible assets, as shown on the schedule, from consolidated "total stockholders' equity" of $1,277,112,000 and found them to be in agreement.

- We compared the amount ($1, 277,112,000) of "net worth" on line 6 of page 3 of the letter referred to above with "total stockholders' equity" in the Consolidated Financial Statements and found them to be in agreement.

- We compared the following amounts on lines 7 and 8, respectively, on page 3 of the letter referred to above with the corresponding amounts appearing in the Consolidated Financial Statements and found them to be in agreement:

Current assets (line 7)	$ 975,962,000
Current liabilities (line 8)	$ 826,947,000

- We compared the amount ($149,015,000) of "net working capital" on line 9 of page 4 of the letter referred to above with an amount derived from the Consolidated Financial Statements by subtracting "total current liabilities" of $826,947,000 from "total current assets" of $975,962,000 and found them to be in agreement.

- We compared the amount ($328,255,000) of "the sum of net income plus depreciation, depletion, and amortization" on line 10 of page 4 of the letter referred to above with an amount derived from the Consolidated Financial Statements by adding "net earnings" of $126,401,000 to "depreciation, depletion, amortization and lease impairment" of $201,854,000 and found them to be in agreement.

- We obtained a schedule prepared by the Company showing assets located in the U.S. ($2,983,322,000). We recomputed this amount by subtracting assets not in the U.S. ($31,352,000), as shown on the schedule, from total assets ($3,014,674,000), as shown on the schedule.

  - We compared the amount ($3,014,674,000) of total assets with the corresponding amount appearing in the Consolidated Financial Statements and found them to be in agreement.

  - We noted assets not in the U.S. comprised accounts receivable aggregating $31,352,000. We agreed the accounts receivable amounts to the Company's December 31, 1997 general ledger.

  - We calculated the ratio of assets located in the U.S. ($2,983,322,000) to total assets ($3,014,674,000) to be in excess of 90%.

We were not engaged to, and did not, perform an audit, the objective of which would be the expression of an opinion on the specified elements, accounts, or items. Accordingly, we do not express such an opinion. Had we performed additional procedures, other matters might have come to our attention that would have been reported to you.

This report is intended solely for the use of the specified users listed above and should not be used by those who have not agreed to the procedures and taken responsibility for the sufficiency of the procedures for their purposes.

KPMG Peat Marwick LLP

March 31, 1998

Supplemental Table VIII-1
Schedule of Activities Required By Compliance Plan CP-50140
Alon USA Big Spring Refinery - Big Spring, Texas
RN100250869

TASK	ACTIVITY	MONTH ACTIVITY TO BE PERFORMED (*Month-Year*)									
		2024	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**
Compliance Monitoring											
	January to June Semiannual Sampling										
	Preparation for Field	Dec-23	Dec-24	Dec-25	Dec-26	Dec-27	Dec-28	Dec-29	Dec-30	Dec-31	Dec-32
	Field Implementation	Jan-24	Jan-25	Jan-26	Jan-27	Jan-28	Jan-29	Jan-30	Jan-31	Jan-32	Jan-33
	Event Close-Out	Feb-24	Feb-25	Feb-26	Feb-27	Feb-28	Feb-29	Feb-30	Feb-31	Feb-32	Feb-33
	Results Received from Laboratory	Mar-24	Mar-25	Mar-26	Mar-27	Mar-28	Mar-29	Mar-30	Mar-31	Mar-32	Mar-33
	July to December Seimiannual Sampling										
	Preparation for Field	Jun-24	Jun-25	Jun-26	Jun-27	Jun-28	Jun-29	Jun-30	Jun-31	Jun-32	Jun-33
	Field Implementation	Jul-24	Jul-25	Jul-26	Jul-27	Jul-28	Jul-29	Jul-30	Jul-31	Jul-32	Jul-33
	Event Close-Out	Aug-24	Aug-25	Aug-26	Aug-27	Aug-28	Aug-29	Aug-30	Aug-31	Aug-32	Aug-33
	Results Received from Laboratory	Sep-24	Sep-25	Sep-26	Sep-27	Sep-28	Sep-29	Sep-30	Sep-31	Sep-32	Sep-33
Compliance Reporting "*CP-50140 Semiannual Monitoring & Status Reports*											
	January to June Semiannual Report										
	Data QA and Evaluation	Mar-24	Mar-25	Mar-26	Mar-27	Mar-28	Mar-29	Mar-30	Mar-31	Mar-32	Mar-33
	Report Preparation	Apr-24	Apr-25	Apr-26	Apr-27	Apr-28	Apr-29	Apr-30	Apr-31	Apr-32	Apr-33
	Final QA Review of Report	Jul-24	Jul-25	Jul-26	Jul-27	Jul-28	Jul-29	Jul-30	Jul-31	Jul-32	Jul-33
	Submittal to the TCEQ	Jul-24	Jul-25	Jul-26	Jul-27	Jul-28	Jul-29	Jul-30	Jul-31	Jul-32	Jul-33
	July to December Seimiannual Report										
	Data QA and Evaluation	Sep-24	Sep-25	Sep-26	Sep-27	Sep-28	Sep-29	Sep-30	Sep-31	Sep-32	Sep-33
	Report Preparation	Oct-24	Oct-25	Oct-26	Oct-27	Oct-28	Oct-29	Oct-30	Oct-31	Oct-32	Oct-33
	Final QA Review of Report	Jan-25	Jan-26	Jan-27	Jan-28	Jan-29	Jan-30	Jan-31	Jan-32	Jan-33	Jan-34
	Submittal to the TCEQ	Jan-25	Jan-26	Jan-27	Jan-28	Jan-29	Jan-30	Jan-31	Jan-32	Jan-33	Jan-34
Well Insstallation		As Needed and/or Required Following Evaluation of Each Semiannual Event									
Well Plugging and Abandonment		As Required Following Well Condition and/or Suitability Evaluation									

SUPPLEMENTAL TABLE VIII-1
UPDATED FINANCIAL ASSURANCE ESTIMATES - 2023 DOLLARS BASIS
Alon USA Big Spring Taxas Refinery
RN100250869

YEAR	CSA		SITE H		SITE E		BICA	TOTALS
	CLOSURE	POST-CLOSURE	CLOSURE	POST-CLOSURE	CLOSURE	POST-CLOSURE	CAP	
2024	$256,253	$0	$0	$50,179	$0	$24,802	$170,400	$501,634
2025	$0	$0	$0	$50,179	$0	$24,802	$170,400	$245,381
2026	$0	$0	$0	$50,179	$0	$0	$170,400	$220,579
2027	$0	$0	$0	$50,179	$0	$0	$170,400	$220,579
2028	$0	$0	$0	$50,179	$0	$0	$170,400	$220,579
2029	$0	$0	$0	$50,179	$0	$0	$170,400	$220,579
2030	$0	$0	$0	$50,179	$0	$0	$170,400	$220,579
2031	$0	$0	$0	$50,179	$0	$0	$170,400	$220,579
2032	$0	$0	$0	$50,179	$0	$0	$170,400	$220,579
2033	$0	$0	$0	$50,179	$0	$0	$170,400	$220,579

TOTALS	**$256,253**	**$0**	**$0**	**$501,790**	**$0**	**$49,604**	**$1,704,000**	**$2,511,647**

Table VIII.B. - Estimated Capital Costs

Task	Cost
Site preparation, fencing, paving, curbing, lighting, roadways	$0.00
Foundations, buildings, other structures, utilities and connections, drainage system, HVAC system, electrical system, wastewater system	$0.00
Process and control equipment	$0.00
Auxiliary equipment, including but not limited to exhaust hoods fans, ducting, pumps, piping, conveyors, stacks, storage tanks, process tanks, waste disposal facilities, pollution control equipment, and fire protection system	$0.00
Process integration and instrumentation	$0.00
Emergency response equipment	$0.00
Transportation equipment	$0.00
Office equipment	$0.00
Engineering design, supervision, overhead	$0.00
Construction expenses including permits, insurance, temporary facilities, and clean-up	$0.00
Contractor's fees and overhead	$0.00
Contingency	$0.00
Total Cost	$0.00

Table VII.E.1. - Permitted Unit Closure Cost Summary

Existing Unit Closure Cost Estimate	
Unit	Cost
Container Storage Area	$215,904.00
Site E LTU [IN POST-CLOSURE]	$0.00
Site H LTU [IN POST-CLOSURE]	$0.00
Total Existing Unit Closure Cost Estimate[1] Year 2023	$215,904.00

Proposed Unit Closure Cost Estimate	
Unit	Cost
Total Proposed Unit Closure Cost Estimate Footnote	

1 As units are added or deleted from these tables through future permit amendments or modifications, the remaining itemized unit costs should be updated for inflation when re-calculating the revised total cost in current dollars.

Table VII.E.2. - Permitted Unit Post-Closure Cost Summary

Existing Unit Closure Cost Estimate	
Unit	Cost
Site E Land Treatment Unit	$744,030.00
Site H Land Treatment Unit	$1,075,230.00
Container Storage Area [PLANNED CLEAN CLOSURE]	$0.00
Total Existing Unit Post-Closure Cost Estimate[1]	$1,819,260.00

Proposed Unit Post-Closure Cost Estimate	
Unit	Cost
Total Proposed Unit Post-Closure Cost Estimate	

1. As units are added or deleted from these tables through future permit amendments or modifications, the remaining itemized unit costs should be updated for inflation when re-calculating the revised total cost in current dollars.

Alon USA, LP
Alon USABig Spring Refinery – Big Spring, TX

Hazardous Waste Permit 50140
Part B Application
SWR No. 30083 / RN100250869 / CN600881783

SECTION VIII
APPENDIX VIII-B
FINANCIAL DISCLOSURE

ALON USA

PO Box 1311 Big Spring, Texas 79721

December 9, 2024

Mr. Martin Torres, Manager
Industrial and Hazardous Waste Permits Section
Texas Commission on Environmental Quality
Building F, MC 130
12100 Park 35 Circle
Austin, Texas 78753

Re: Financial Disclosure Letter for Alon USA, LP

Permit Renewal
Hazardous Waste Permit No. 50140 / Compliance Plan No. 50140
Industrial Solid Waste Registration No. 30083
EPA ID No. [TXD00813468
RN100250869; CN600881783

Dear Mr. Torres:

This letter is furnished to you in response to financial disclosure requirements as applicable under Texas Health and Safety Code Section 361.085 and Title 30, Texas Administrative Code (30 TAC), Section 305.50 to provide assurance that Alon USA, LP has sufficient financial resources.

In keeping with the above law and rule requirements I hereby certify that Alon USA, LP is adequately capitalized and has sufficient financial resources to operate, close, provide post-closure care for and perform corrective action for the above-referenced facility in a safe manner, and in compliance with the permit and all applicable rules.

Alon USA, LP currently provides an Insurance Policy as financial assurance mechanism as set out in 30 TAC, Chapter 37, Subchapter C to meet Alon USA, LP's financial assurance obligations.

I am authorized to make these statements on behalf of Alon USA, LP. I understand that the TCEQ may request additional information as part of their review.

Sincerely,

Frank J. Burgard III

Sr. Manager, Environmental

Delek US (Alon USA, LP Big Spring Refinery)

Alon USA, LP
Alon USA Big Spring Refinery
Big Spring, TX

Hazardous Waste Permit 50140
Part B Application
SWR No. 30083 / RN100250869 / CN600881783

SECTION IX
RELEASES FROM SOLID WASTE MANAGEMENT UNITS AND CORRECTIVE ACTION

IX. Releases from Solid Waste Units and Corrective Action

Provide all Part B responsive information in Appendix IX. When preparing the physical format organize your submittal using the Format of Hazardous Waste permit Application and Instructions.

The Texas Solid Waste Disposal Act, 30 TAC 335.167, 40 CFR 270.14(d) and Section 3004(u) of the Hazardous and Solid Waste Amendments of 1984 (HSWA) *require that each hazardous waste management permit application review shall address corrective action for all releases of hazardous waste and hazardous constituents* listed in 40 CFR 261, Appendix VIII, 40 CFR Part 264, Appendix IX, and/or other constituents of concern from any solid waste management unit (SWMU) and/ or Areas of Concern (AOCs) at a facility, regardless of the time at which waste was placed in such unit[2]. For the purposes of HSWA Corrective Action, a SWMU may include, but is not limited to, any landfill, surface impoundment, land treatment unit, waste pile, underground injection well, incinerator, boiler, industrial furnace, tank, container storage area, drip pad, containment building, miscellaneous unit; any units exempt from hazardous waste permitting requirements, such as wastewater treatment units, elementary neutralization units, totally enclosed treatment units, waste recycle/reuse units, and 90-day accumulation time units; or process units or areas which may have routine and/or systematic releases to the environment (e.g., process drainage ditches or product storage tanks). Current EPA interpretation of this requirement has resulted in a Corrective Action process that begins with a RCRA Facility Assessment (RFA) to determine if corrective action is necessary.

[2]For the purposes of HSWA Corrective Action, a SWMU may include, but is not limited to, any landfill, surface impoundment, land treatment unit, waste pile, underground injection well, incinerator, boiler, industrial furnace, tank, container storage area, drip pad, containment building, miscellaneous unit; any units exempt from hazardous waste permitting requirements, such as wastewater treatment units, elementary neutralization units, totally enclosed treatment units, waste recycle/reuse units, and 90-day accumulation time units; or process units or areas which may have routine and/or systematic releases to the environment (e.g., process drainage ditches or product storage tanks).

The first step in the RFA is the development of a Preliminary Review (PR) from all available documentation for a facility (including but not limited to all facility documents, Part A, and Part B of the permit application, TCEQ correspondence files and inspection reports, etc.). The PR compiles available information on every SWMU and/or AOC that has ever existed at the facility. A unit checklist is completed for each SWMU and/ or AOC. On a unit-by-unit basis, the PR may recommend no further action for:

- well-designed and well-managed units
- units that have not managed hazardous wastes or wastes containing hazardous constituents;
- units already under corrective action by enforcement order; or
- units scheduled to be addressed in a compliance plan.

In addition, the unit checklists are summarized in a *Facility Checklist*. If there is a known release or potential for a release of hazardous waste or hazardous constituents from a unit/area, the PR may recommend a *RCRA Facility Investigation* (RFI), or an *Affected Property Assessment* (APA), if 30 TAC Chapter 350, Texas Risk Reduction Program (TRRP) applies, to determine the extent of the release for future corrective action, or stabilization as an appropriate and immediate corrective action.

The second step is a *Visual Site Inspection* (VSI) of the entire facility. The RFA is the combination of the PR and VSI documentation and any sample results. The RFA process should be scheduled so as to be completed during the latter stages of the Technical Review process or no later than one month in advance of the preparation of an initial draft permit for the facility. The RFA includes recommendations for whether further investigation or corrective action is warranted.

The requirements for an RFI or any other corrective action will be included in the permit, in the associated compliance plan which is mandatory for facilities with known groundwater contamination, or pursuant to 40 CFR 270.14(d)(3), the applicant may be required to start the RFI or other corrective action before the permit is issued. The RFI shall comply with all the applicable items contained in the U.S. EPA publication EPA/520-R-94-004, OSWER Directive 9902.3-2A, RCRA Corrective Action Plan (Final), May 1994, unless an alternate investigation approach is approved by the Executive Director. An RFI workplan may typically include a soil boring program, installation of monitoring wells, and sampling and analysis for 40 CFR 261 Appendix VIII and 40 CFR 264 Appendix IX hazardous constituents for surface soils, subsurface strata, surface water, groundwater, and/or air.

The permittee shall perform the RFI or APA and report the results. Corrective Action under 30 TAC Chapter 350 consists of an APA, determination of protective concentration levels, selection of a remedy standard (if necessary), development and implementation of a response action (if necessary), and submittal of required report according to 30 TAC Chapter 350.

If the RFI report indicates releases of hazardous waste or hazardous constituents for SWMUs and/or AOCs that have been grandfathered under 30 TAC Chapter 335 Subchapters A and S, Corrective Action shall consists of, if necessary, Interim Corrective Measures, *Baseline Risk Assessment* (BLRA)/*Corrective Measures Study* (CMS) Report, and *Corrective Measures Implementation* (CMI).

For grandfathered SWMUs and/or AOCs, the permittee may continue to complete the Corrective Action requirements under 30 TAC Chapter 335, Subchapter A and S, provided the permittee complies with the notification and schedule requirements pursuant to 30 TAC 335.8 and 350.(2)(m).

This report shall evaluate the risk, identify and evaluate corrective measure alternatives, and recommend appropriate corrective measure(s) to protect human health and the environment. The BLRA/CMS Report shall address all of the applicable items in 30 TAC 350, 30 TAC 335 Subchapter S, and the U.S. EPA publication EPA/520-R-94-004, OSWER Directive 9902.3-2A, RCRA Corrective Action Plan (Final), May 1994.

Upon approval of the BLRA/CMS Report by the TCEQ, the permittee shall submit a CMI Workplan to address all of the items for CMI Workplan contained in the U.S. EPA publication EPA/520-R-94-004, OSWER Directive 9902.3-2A, RCRA Corrective Action Plan (Final), May 1994. For projects conducted under TRRP, the risk assessment process shall be addressed in the *Affected Property Assessment Report* (APAR), and the evaluation of corrective measures shall be

conducted as part of the remedy standard selection process provided in the *Response Action Plan* (RAP). If the CMI or RAP does not propose a permanent remedy, then a CMI Workplan or RAP shall be submitted as part of a new compliance plan application or as a modification/ amendment application to an existing compliance plan. The workplan or RAP shall contain detailed final engineering design, monitoring plans, and schedules necessary to implement the selected remedy. Implementation of the corrective measures shall be addressed through a new and/or a modified/amended compliance plan. Upon installation of a corrective action system based upon the approved CMI Workplan or RAP, the permittee shall submit a CMI Report or RAP which includes as-built drawings of the corrective action system. To report the progress of the corrective measures, the permittee shall submit periodic CMI Progress Reports or Response Action Effectiveness Reports to the TCEQ in accordance with the schedule specified in the compliance plan. Upon completion of the corrective action requirements, the permittee shall submit CMI Report or Response Action Completion Reports for review and approval.

Please note that the applicant/permittee may perform voluntary corrective action, stabilization, or "interim measures" at any time prior to or during the RFA/RFI/CMS/CMI or the APAR/RAP process without prior TCEQ approval. The TCEQ strongly supports these actions when undertaken to mitigate releases or reduce or minimize exposure and releases to human health and the environment.

A. Preliminary Review Checklists

For Applications for a New Hazardous Waste Permit:

- For all facility Solid Waste Management Units (SWMUs) and/or Areas of Concern (AOCs), complete the accompanying forms entitled "Preliminary Review Facility Checklist" and "Preliminary Review Unit Checklist". Make additional copies as necessary.

For Applications for a Renewal/Amendment/Modification of an Existing Hazardous Waste Permit:

- Update the Preliminary Review Facility Checklist to include any newly identified SWMUs and/or AOCs that were not incorporated into the previous permit issuance (new, amendment, modification, or renewal), and to update the status of all previously identified SWMUs or AOCs which are incorporated into the existing permit under either Section IX - Corrective Action for Solid Waste Management Units, or Section XI - Compliance Plan. Status updates should include notes regarding whether the SWMU or AOC has been incorporated into a compliance plan, has received approval of no further action (NFA), has had changes in its corrective action status, or has had other determinations issued by the TCEQ. Include the date of the status change in the updated checklist;
- Complete the Preliminary Review Unit Checklists for any newly identified SWMUs or AOCs that were not incorporated into the previous permit issuance (new, amendment, modification, or renewal);
- Update the status on the Preliminary Review Unit Checklists for all previously identified SWMUs or AOCs that had not yet received TCEQ approval of NFA at the time of the previous permit issuance;
- Provide copies of the letters from the TCEQ approving NFA or other determinations that were issued since the previous permit issuance;
- For previously identified SWMUs and/or AOCs which are incorporated into the existing permit and are included in Section XI - Compliance Plan of this application, you may forego filling out the Preliminary Review Unit Checklists for these units. Briefly note on the Preliminary Review Facility Checklist that the SWMUs or AOCs are addressed in

Section XI. Provide the location where the SWMU's and addressed in Section XI. ; or

- If all previously identified SWMUs and/or AOCs reached NFA status at or before the last permit issuance you may forego filling out the Preliminary Review Unit Checklists, indicate Not Applicable, and provide a brief explanation of the facts.

Complete Preliminary Review Facility Checklist (located in attachments)

Instructions for Preliminary Review Unit Checklist

Preliminary Review Facility Checklist

Preliminary Review Unit Checklist

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#004 - SITE D – Cell #1	E790000, N246750	Appendix I, Sheet 1 & 3	Page 3
#004 - SITE D - Cell #2	E790700, N246800	Appendix I, Sheet 1 & 3	Page 4
#004 - SITE D - Cell #3	E790400, N246800	Appendix I, Sheet 1 & 3	Page 5
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WP-18	E792400, N243600	Appendix I, Sheet 1 & 5	Page 64
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Alon USA, LP
Alon USA Big Spring Refinery
Big Spring, TX

Hazardous Waste Permit 50140 - Part B
Application SWR No. 30083 / RN100250869 / CN600881783

APPENDIX IX
APPLICATION RESPONSES
Releases from Solid Waste Management Units and Corrective Action

Alon USA, LP
Alon USA Big Spring Refinery
Big Spring, TX

Hazardous Waste Permit 50140 - Part B
Application SWR No. 30083 / RN100250869 / CN600881783

SECTION IX.A
PRELIMINARY REVIEW FACILITY CHECKLIST

PRELIMINARY REVIEW FACILITY CHECKLIST

Facility:	**Alon USA LP**	City:	**Big Spring, TX**
ISW Reg. No.:	**30083**	Date:	**March 18, 2024**
Permit No.:	**HW-50140**	Reviewer:	**Robert L. Sherrill, PG**
EPA ID No:	**TXD008013468**		

I. Waste Management Units:

1. RCRA Regulated Units:

NOR No. / Process Code	Description	Status
001 / S99	Container Storage Area (North Pad)	Active
020 / S99	Container Storage Area (Central Pad)	Active
021 / S99	Container Storage Area (South Pad)	Active
005 / T04	Site E LTU	Closed / Post-Closure
010 / T04	Site H LTU	Closed / Post-Closure
009 / D81	Site G LTDP	Closed / No Further Action

2. Solid Waste Management Units:

NOR No. / Process Code	Description	Status
002 / D80	Site B – NH Landfill	Active
004 / D80	Site D – NH Asphalt Landfill	Closed / No Further Action
007 / D83	Site F – NH Surface Impoundment	Active
012 / D80	Site K – NH Landfill	Active
013 / D80	Site J – NH Landfill	Active
014 / D80	Site L – NH Landfill	Active
------ / D99	A1 – API Separator	Closed / No Further Action
------ / D99	A2 – API Separator	Closed / No Further Action
------ / D99	A3 – API Separator	Closed / No Further Action
------ / T01	CS-1 – Caustic Sump	Closed / No Further Action
------ / X99	FFA – Fire-Fighting Training Area	Closed / No Further Action
------ / D81	Lead Area – Impacted Soils Area	Closed / No Further Action
------ / D81	Site 1 – NH Land-spreading Area	Closed / No Further Action
------ / D81	Site 2 – NH Land-spreading Area	Closed / No Further Action
------ / D81	Site 3 – NH Land-spreading Area	Closed / No Further Action
------ / D81	Site 4 – NH Land-spreading Area	Closed / No Further Action
------ / D80	Site C – NH Landfill	Closed / No Further Action
------ / D80	Site LF 1 – NH Landfill	Closed / No Further Action
------ / T01	T38 – Caustic Tank	Closed / No Further Action
------ / S02	T52 – Tank	Closed / No Further Action
------ / S02	T176 – Tank	Closed / No Further Action
------ / T01	V2 – Surge Tank	Closed / No Further Action
------ / T04	V3 – Clarifier	Closed / No Further Action
------ / S02	V4 – Tank	Closed / No Further Action
------ / S99	VFD 1 – Dumpster	Closed / No Further Action
------ / T02	W-1 – Surface Impoundment	Closed / No Further Action
------ / T02	W-2 – Surface Impoundment	Closed / No Further Action
------ / T02	W-3 – Surface Impoundment	Closed / No Further Action

------ / T02	W-4 – Surface Impoundment	Closed / No Further Action
------ / T02	W-5 – Surface Impoundment	Closed / No Further Action
------ / S03	Waste Pile	Closed / No Further Action
------ / T02	WP-1 – Surface Impoundment	Closed / No Further Action
------ / T02	WP-2 – Surface Impoundment	Closed / No Further Action
------ / S02	WP-3 – Concrete Tank	Closed / No Further Action
------ / S02	WP-3A – Concrete Tank	Closed / No Further Action
------ / S02	WP-3B – Concrete Tank	Closed / No Further Action
------ / S02	WP-4 – Concrete Tank	Closed / No Further Action
------ / S02	WP-4A – Concrete Tank	Closed / No Further Action
------ / S02	WP-4B – Concrete Tank	Closed / No Further Action
------ / T02	WP-5 – Surface Impoundment	Closed / No Further Action
------ / T02	WP-6 – Surface Impoundment	Closed / No Further Action
------ / T02	WP-7 – Surface Impoundment	Closed / No Further Action
------ / T02	WP-7A – Surface Impoundment	(under Site E) - NFA
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------ / T02	WP-14 – Surface Impoundment	Closed / No Further Action
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------ / T02	WP-26 – Surface Impoundment	Closed / No Further Action
------ / T02	WP-27 – Surface Impoundment	Closed / No Further Action
------ / T02	WP-28 – Surface Impoundment	Closed / No Further Action
------ / T02	WP-29 – Surface Impoundment	(under Site E) - NFA

II. Reviewed Documents

1. RCRA: Part A _X_ (1985, 2001, 2014)
   Part B _X_ (1985, 2001, 2014)
   Permit _X_ (May 16, 2001, 2014)
2. CERCLA:
3. Inspection Report
4. Enforcement Actions:
5. Exposure Information:
6. Other Information: RFI & RACR reports

Numerous permit modifications
(2001-2010)

III. Summary

6 Active units, 2 Post-Closure units, 64 Closed units

IV. Recommended Action:

none

Alon USA, LP
Alon USABig Spring Refinery
Big Spring, TX

Hazardous Waste Permit 50140 - Part B Application
SWR No. 30083 / RN100250869 / CN600881783

SECTION IX.B
PRELIMINARY REVIEW UNIT CHECKLIST

PRELIMINARY REVIEW UNIT CHECKLIST

Facility:	**Alon USA LP,Big Spring Refinery**	City:	**Big Spring, Texas**
ISW Reg. No:	**SWR-30083**	Date:	**March 19, 2024**
Permit No:	**HW-50140**	Reviewer:	**Robert Sherrill, PG**
EPA ID No:	**TXD008013468**	Status:	**NO FURTHER ACTION**

I. Waste Management Unit:

A. NOR No: **na**
Other Identifier: **A1**
Grid Locations: **E790100, N241300**

B. Process Code/Unit Type **D99 – Below Grade API Separator (90,000 gallons), Concrete Containment**

C. Dates of Operation **1953-1970s**

II. Waste Managed: **oily process WW, dilute waste caustic from CS-1, cooling tower blowdowns, effluent from tank farm water draw system and sludge dewatering system**

III, Evidence of Release: **No evidence of release during investigation**

IV. Pollutant Dispersal Pathways: **Potential - Through unsaturated zone to aquifer, south along groundwater gradient to Beal's Creek**

V. Summary:

RFI Investigation Phase:	**RFI Group 4 Unit**
GW Investigation Report Approved:	**19-Oct-1993**
Soils Investigation Report Approved:	**9-Jan-2006**
APAR Approved:	**9-Jan-2006**
CMS or RAP Approved:	**3-Jan-2006**
CMI or RACR Approved:	**30-May-2007**
NFA Issuance Letter:	**30-May-2007**

VI. Recommended Action: **No Further Action**

PRELIMINARY REVIEW UNIT CHECKLIST

Facility:	**Alon USA LP Big Spring Refinery**	City:	**Big Spring, Texas**
ISW Reg. No:	**SWR-30083**	Date:	**March 19, 2024**
Permit No:	**HW-50140**	Reviewer:	**Robert Sherrill, PG**
EPA ID No:	**TXD008013468**	Status:	**NO FURTHER ACTION**

I. Waste Management Unit:

A. NOR No: **na**
Other Identifier: **A2**
Grid Locations: **E790100, N241300**

D. Process Code/Unit Type: **D99 – Below Grade API Separator (75,000 gallons), Below grade concrete containment**

B. Dates of Operation: **1953 to 1970s**

II. Waste Managed: **oily process WW, dilute waste caustic from CS-1, cooling tower blowdown, effluent from tank farm water draw system and sludge dewatering system**

III, Evidence of Release: **No evidence of release during investigation**

IV. Pollutant Dispersal Pathways: **Potential - Through unsaturated zone to aquifer, south along groundwater gradient to Beal's Creek**

V. Summary:

RFI Investigation Phase:	**RFI Group 4 Unit**
GW Investigation Report Approved:	**19-Oct-1993**
Soils Investigation Report Approved:	**9-Jan-2006**
APAR Approved:	**9-Jan-2006**
CMS or RAP Approved:	**3-Jan-2006**
CMI or RACR Approved:	**30-May-2007**
NFA Issuance Letter:	**30-May-2007**

VI. Recommended Action: **No Further Action**

PRELIMINARY REVIEW UNIT CHECKLIST

Facility:	**Alon USA LP Big Spring Refinery**	City:	**Big Spring, Texas**
ISW Reg. No:	**SWR-30083**	Date:	**March 19, 2024**
Permit No:	**HW-50140**	Reviewer:	**Robert Sherrill, PG**
EPA ID No:	**TXD008013468**	Status:	**NO FURTHER ACTION**

I. Waste Management Unit:

A. NOR No: **na**
Other Identifier: **A3**
Grid Locations: **E790050, N241300**

B. Description: **D99 – Below Grade API Separator (41,000 gallons), Below grade concrete containment**

C. Dates of Operation **1976-1987**

II. Waste Managed: **Effluent from crude desalter units prior to discharge into A-1 and A-2**

III, Evidence of Release: **No evidence of release during investigation**

IV. Pollutant Dispersal Pathways: **Potential - Through unsaturated zone to aquifer, south along groundwater gradient to Beal's Creek**

V. Summary:

RFI Investigation Phase:	**RFI Group 4 Unit**
GW Investigation Report Approved:	**19-Oct-1993**
Soils Investigation Report Approved:	**9-Jan-2006**
APAR Approved:	**9-Jan-2006**
CMS or RAP Approved:	**3-Jan-2006**
CMI or RACR Approved:	**30-May-2007**
NFA Issuance Letter:	**30-May-2007**

VI. Recommended Action: **No Further Action**

PRELIMINARY REVIEW UNIT CHECKLIST

Facility:	**Alon USA LP Big Spring Refinery**	City:	**Big Spring, Texas**
ISW Reg. No:	**SWR-30083**	Date:	**March 19, 2024**
Permit No:	**HW-50140**	Reviewer:	**Robert Sherrill, PG**
EPA ID No:	**TXD008013468**	Status:	**NO FURTHER ACTION**

I. Waste Management Unit:

A. NOR No: **na**
Other Identifier: **CS-1**
Grid Locations: **E790050, N241400**

B. Description: **S02 – Caustic Surge Tank (12,900 gallons)**

C. Dates of Operation **1970 - 1987**

II. Waste Managed: **Dilute waste caustic streams from distillate treater routed for equalization prior to dischage into A-1 and A-2**

III, Evidence of Release: **No evidence of release during investigation**

IV. Pollutant Dispersal Pathways: **Potential - Through unsaturated zone to aquifer, south along groundwater gradient to Beal's Creek**

V. Summary:

RFI Investigation Phase:	**RFI Group 4 Unit**
GW Investigation Report Approved:	**19-Oct-1993**
Soils Investigation Report Approved:	**9-Jan-2006**
APAR Approved:	**9-Jan-2006**
CMS or RAP Approved:	**3-Jan-2006**
CMI or RACR Approved:	**30-May-2007**
NFA Issuance Letter:	**30-May-2007**

VI. Recommended Action: **No Further Action**

PRELIMINARY REVIEW UNIT CHECKLIST

Facility:	**Alon USA LP Big Spring Refinery**	City:	**Big Spring, Texas**
ISW Reg. No:	**SWR-30083**	Date:	**March 19, 2024**
Permit No:	**HW-50140**	Reviewer:	**Robert Sherrill, PG**
EPA ID No:	**TXD008013468**	Status:	**ACTIVE UNIT**

I. Waste Management Unit:

D. NOR No: **001**
Other Identifier: **CS-A**
Grid Locations: **E790200, N245400**

E. Description: **S99 – Container Storage North Pad. (8,800 gallons)**

F. Dates of Operation **1980-Present (Active Unit)**

II. Waste Managed: **Spent Ni/Mo-Co/Ni/Mo-Co/Mo on Alumina catalyst, chromate bearing solids, asbestos, spromatic spill cleanup, PCB capacitor, styrene wastes, nickel catalyst**

III, Evidence of Release: **No evidence of release during investigation**

IV. Pollutant Dispersal Pathways: **Potential - Through unsaturated zone to aquifer, south along groundwater gradient to Beal's Creek**

V. Summary:

RFI Investigation Phase:	**na - RCRA Unit**
GW Investigation Report Approved:	**na**
Soils Investigation Report Approved:	**na**
APAR Approved:	**na**
CMS or RAP Approved:	**na**
CMI or RACR Approved:	**na**
NFA Issuance Letter:	**na**

VI. Recommended Action: **Active**

PRELIMINARY REVIEW UNIT CHECKLIST

Facility:	**Alon USA LP Big Spring Refinery**	City:	**Big Spring, Texas**
ISW Reg. No:	**SWR-30083**	Date:	**March 19, 2024**
Permit No:	**HW-50140**	Reviewer:	**Robert Sherrill, PG**
EPA ID No:	**TXD008013468**	Status:	**ACTIVE UNIT**

I. Waste Management Unit:

A. NOR No: **020**
Other Identifier: **CS-B**
Grid Locations: **E790200, N245400**

B. Description: **S99 – Container Storage Central Pad. (8,800 gallons)**

C. Dates of Operation **1980-Present (Active Unit)**

II. Waste Managed: **Lead contaminated soils, spent fluorescent lamps, solid styrene/polystyrene waste**

III, Evidence of Release: **No evidence of release during investigation**

IV. Pollutant Dispersal Pathways: **Potential - Through unsaturated zone to aquifer, south along groundwater gradient to Beal's Creek**

V. Summary:

RFI Investigation Phase:	**na - RCRA Unit**
GW Investigation Report Approved:	**na**
Soils Investigation Report Approved:	**na**
APAR Approved:	**na**
CMS or RAP Approved:	**na**
CMI or RACR Approved:	**na**
NFA Issuance Letter:	**na**

VI. Recommended Action: **Active**

PRELIMINARY REVIEW UNIT CHECKLIST

Facility:	**Alon USA LP Big Spring Refinery**	City:	**Big Spring, Texas**
ISW Reg. No:	**SWR-30083**	Date:	**March 19, 2024**
Permit No:	**HW-50140**	Reviewer:	**Robert Sherrill, PG**
EPA ID No:	**TXD008013468**	Status:	**ACTIVE UNIT**

I. Waste Management Unit:

A. NOR No: **201**
Other Identifier: **CS-C**
Grid Locations: **E790200, N245400**

B. Description: **S99 – Container Storage South Pad. (4,400 gallons)**

C. Dates of Operation **1980-Present**

II. Waste Managed: **spent solvents, mixed hydrocarbons, liquid styrene/polystyrene waste**

III, Evidence of Release: **No evidence of release during investigation**

IV. Pollutant Dispersal Pathways: **Potential - Through unsaturated zone to aquifer, south along groundwater gradient to Beal's Creek**

V. Summary:

RFI Investigation Phase:	**na - RCRA Unit**
GW Investigation Report Approved:	**na**
Soils Investigation Report Approved:	**na**
APAR Approved:	**na**
CMS or RAP Approved:	**na**
CMI or RACR Approved:	**na**
NFA Issuance Letter:	**na**

VI. Recommended Action: **Active**

PRELIMINARY REVIEW UNIT CHECKLIST

Facility:	**Alon USA LP Big Spring Refinery**	City:	**Big Spring, Texas**
ISW Reg. No:	**SWR-30083**	Date:	**March 19, 2024**
Permit No:	**HW-50140**	Reviewer:	**Robert Sherrill, PG**
EPA ID No:	**TXD008013468**	Status:	**NO FURTHER ACTION**

I. Waste Management Unit:

A. NOR No: **na**
Other Identifier: **FFA**
Grid Locations: **E788500, N244800**

B. Description: **X99 – Fire Fighting Area (0.92 acres)**

C. Dates of Operation **1971-Present (Active Unit)**

II. Waste Managed: **Unleaded gasoline, diesel, propane, ansul+50-sodium bicarbonate base powder, ansul purple K - potassium bicarbonate base powder, 3M AFFF aqueous film foam, benzene, toluene, ethylbenzene, xylene**

III, Evidence of Release: **No evidence of release during investigation**

IV. Pollutant Dispersal Pathways: **Potential - Through unsaturated zone to aquifer, south along groundwater gradient to Beal's Creek**

V. Summary:

RFI Investigation Phase:	**Phase I, Subphase 5**
GW Investigation Report Approved:	**19-Jan-1995**
Soils Investigation Report Approved:	**26-May-2000**
APAR Approved:	**na**
CMS or RAP Approved:	**26-May-2000**
CMI or RACR Approved:	**29-Jan-2002**
NFA Issuance Letter:	**29-Jan-2002**

VI. Recommended Action: **No Further Action**

PRELIMINARY REVIEW UNIT CHECKLIST

Facility:	**Alon USA LP Big Spring Refinery**	City:	**Big Spring, Texas**
ISW Reg. No:	**SWR-30083**	Date:	**March 19, 2024**
Permit No:	**HW-50140**	Reviewer:	**Robert Sherrill, PG**
EPA ID No:	**TXD008013468**	Status:	**NO FURTHER ACTION**

I. Waste Management Unit:

A. NOR No: **na**
Other Identifier: **LEAD AREA**
Grid Locations: **E792700, N244500**

B. Description: **D81 – Spreading Area (~ 1.5 acres)**

C. Dates of Operation **Unknown – Discovered 2003**

II. Waste Managed: **Lead contaminated soils**

III, Evidence of Release: **No evidence of release during investigation**

IV. Pollutant Dispersal Pathways: **Potential - Through unsaturated zone to aquifer, south along groundwater gradient to Beal's Creek**

V. Summary:

RFI Investigation Phase:	**na**
GW Investigation Report Approved:	**19-Jan-1995**
Soils Investigation Report Approved:	**12-Apr-2004**
APAR Approved:	**4-Dec-2006**
CMS or RAP Approved:	**na**
CMI or RACR Approved:	**15-Sep-2010**
NFA Issuance Letter:	**23-Jul-2003**

VI. Recommended Action: **No Further Action**

PRELIMINARY REVIEW UNIT CHECKLIST

Facility:	**Alon USA LP Big Spring Refinery**	City:	**Big Spring, Texas**
ISW Reg. No:	**SWR-30083**	Date:	**March 19, 2024**
Permit No:	**HW-50140**	Reviewer:	**Robert Sherrill, PG**
EPA ID No:	**TXD008013468**	Status:	**NO FURTHER ACTION**

I. Waste Management Unit:

A. NOR No: **na**
Other Identifier: **SITE 1**
Grid Locations: **E790000, N243500**

B. Description: **D81 – Land-spreading Area (0.2 acres)**

C. Dates of Operation **1977**

II. Waste Managed: **Bauxite, petroleum coke, spent treating clay, iron oxide catalyst, Ni-Moly catalyst**

III, Evidence of Release: **No evidence of release during investigation**

IV. Pollutant Dispersal Pathways: **Potential - Through unsaturated zone to aquifer, south along groundwater gradient to Beal's Creek**

V. Summary:

RFI Investigation Phase:	**Phase II, Subphase 3**
GW Investigation Report Approved:	**19-Jan-1995**
Soils Investigation Report Approved:	**23-Jul-2003**
APAR Approved:	**na**
CMS or RAP Approved:	**na**
CMI or RACR Approved:	**na**
NFA Issuance Letter:	**23-Jul-2003**

VI. Recommended Action: **No Further Action**

PRELIMINARY REVIEW UNIT CHECKLIST

Facility:	**Alon USA LP Big Spring Refinery**	City:	**Big Spring, Texas**
ISW Reg. No:	**SWR-30083**	Date:	**March 19, 2024**
Permit No:	**HW-50140**	Reviewer:	**Robert Sherrill, PG**
EPA ID No:	**TXD008013468**	Status:	**NO FURTHER ACTION**

I. Waste Management Unit:

A. NOR No: **na**
Other Identifier: **SITE 2**
Grid Locations: **E789600, N244200**

B. Description: **D81 – Land-spreading Area (2.08 acres)**

C. Dates of Operation **1979**

II. Waste Managed: **Spent treating clay, Ni-Moly catalyst**

III, Evidence of Release: **No evidence of release during investigation**

IV. Pollutant Dispersal Pathways: **Potential - Through unsaturated zone to aquifer, south along groundwater gradient to Beal's Creek**

V. Summary:

RFI Investigation Phase:	**Phase II, Subphase 3**
GW Investigation Report Approved:	**19-Jan-1995**
Soils Investigation Report Approved:	**29-Jan-2002**
APAR Approved:	**na**
CMS or RAP Approved:	**na**
CMI or RACR Approved:	**na**
NFA Issuance Letter:	**29-Jan-2002**

VI. Recommended Action: **No Further Action**

PRELIMINARY REVIEW UNIT CHECKLIST

Facility:	**Alon USA LP Big Spring Refinery**	City:	**Big Spring, Texas**
ISW Reg. No:	**SWR-30083**	Date:	**March 19, 2024**
Permit No:	**HW-50140**	Reviewer:	**Robert Sherrill, PG**
EPA ID No:	**TXD008013468**	Status:	**NO FURTHER ACTION**

I. Waste Management Unit:

A. NOR No: **na**
Other Identifier: **SITE 3**
Grid Locations: **E788600, N244250**

B. Description: **D81 – Land-spreading Area (2.77 acres)**

C. Dates of Operation **1981-1983**

II. Waste Managed: **Spent treating clay, iron oxide catalyst, Ni/Mo catalyst, carbon absorbent, antimony, arsenic, barium, cadmium, chromium, lead, selenium**

III, Evidence of Release: **No evidence of release during investigation**

IV. Pollutant Dispersal Pathways: **Potential - Through unsaturated zone to aquifer, south along groundwater gradient to Beal's Creek**

V. Summary:

RFI Investigation Phase:	**Phase I, Subphase 5**
GW Investigation Report Approved:	**19-Jan-1995**
Soils Investigation Report Approved:	**2-Feb-2001**
APAR Approved:	**na**
CMS or RAP Approved:	**26-May-2000**
CMI or RACR Approved:	**29-Jan-2002**
NFA Issuance Letter:	**2-Feb-2001**

VI. Recommended Action: **No Further Action**

PRELIMINARY REVIEW UNIT CHECKLIST

Facility:	**Alon USA LP Big Spring Refinery**	City:	**Big Spring, Texas**
ISW Reg. No:	**SWR-30083**	Date:	**March 19, 2024**
Permit No:	**HW-50140**	Reviewer:	**Robert Sherrill, PG**
EPA ID No:	**TXD008013468**	Status:	**NO FURTHER ACTION**

I. Waste Management Unit:

A. NOR No: **na**
Other Identifier: **SITE 4**
Grid Locations: **E788000, N245100**

B. Description: **D81 – Land-spreading Area (0.68 acres)**

C. Dates of Operation **1978**

II. Waste Managed: **Spent treating clay, iron oxide catalyst, Ni/Mo catalyst, bauxite, rock, sand, gravel, antimony, arsenic, barium, cadmium, chromium, lead, nickel, selenium**

III, Evidence of Release: **No evidence of release during investigation**

IV. Pollutant Dispersal Pathways: **Potential - Through unsaturated zone to aquifer, south along groundwater gradient to Beal's Creek**

V. Summary:

RFI Investigation Phase:	**Phase I, Subphase 4**
GW Investigation Report Approved:	**19-Jan-1995**
Soils Investigation Report Approved:	**23-Jul-2003**
APAR Approved:	**na**
CMS or RAP Approved:	**24-May-2000**
CMI or RACR Approved:	**2-Feb-2001**
NFA Issuance Letter:	**23-Jul-2003**

VI. Recommended Action: **No Further Action**

PRELIMINARY REVIEW UNIT CHECKLIST

Facility:	**Alon USA LP Big Spring Refinery**	City:	**Big Spring, Texas**
ISW Reg. No:	**SWR-30083**	Date:	**March 19, 2024**
Permit No:	**HW-50140**	Reviewer:	**Robert Sherrill, PG**
EPA ID No:	**TXD008013468**	Status:	**ACTIVE**

I. Waste Management Unit:

A. NOR No: **002**
Other Identifier: **SITE B**
Grid Locations: **E789500, N244700**

B. Description: **D80 – Landfill (27.86 acres)**

C. Dates of Operation **1957-Present**

II. Waste Managed: **Polystyrene resin, misc. trash, plant refuse, construction debris, non-combustible waste, asbestos, sulfur, antioxidant, spent MTBR catalyst**

III, Evidence of Release: **No evidence of release during investigation**

IV. Pollutant Dispersal Pathways: **Potential - Through unsaturated zone to aquifer, south along groundwater gradient to Beal's Creek**

V. Summary:

RFI Investigation Phase:	**Phase II, Subphase 3**
GW Investigation Report Approved:	**19-Jan-1995**
Soils Investigation Report Approved:	**23-Jul-2003**
APAR Approved:	**na**
CMS or RAP Approved:	**na**
CMI or RACR Approved:	**na**
NFA Issuance Letter:	**23-Jul-2003**

VI. Recommended Action: **Active Unit**

PRELIMINARY REVIEW UNIT CHECKLIST

Facility:	**Alon USA LP Big Spring Refinery**	City:	**Big Spring, Texas**
ISW Reg. No:	**SWR-30083**	Date:	**March 19, 2024**
Permit No:	**HW-50140**	Reviewer:	**Robert Sherrill, PG**
EPA ID No:	**TXD008013468**	Status:	**NO FURTHER ACTION**

I. Waste Management Unit:

A. NOR No: **na**
Other Identifier: **SITE C**
Grid Locations: **E789900, N244500**

B. Description: **D80 – Landfill (4.55 acres)**

C. Dates of Operation **Unknown-1981**

II. Waste Managed: **Petroleum coke, spent treating clay, iron oxide catalyst, plant refuse, misc. trash, construction debris, non-combustible waste**

III, Evidence of Release: **No evidence of release during investigation**

IV. Pollutant Dispersal Pathways: **Potential - Through unsaturated zone to aquifer, south along groundwater gradient to Beal's Creek**

V. Summary:

RFI Investigation Phase:	**Phase II, Subphase 3**
GW Investigation Report Approved:	**19-Jan-1995**
Soils Investigation Report Approved:	**12-Apr-2004**
APAR Approved:	**na**
CMS or RAP Approved:	**na**
CMI or RACR Approved:	**na**
NFA Issuance Letter:	**23-Jul-2003**

VI. Recommended Action: **No Further Action**

PRELIMINARY REVIEW UNIT CHECKLIST

Facility:	**Alon USA LP Big Spring Refinery**	City:	**Big Spring, Texas**
ISW Reg. No:	**SWR-30083**	Date:	**March 19, 2024**
Permit No:	**HW-50140**	Reviewer:	**Robert Sherrill, PG**
EPA ID No:	**TXD008013468**	Status:	**NO FURTHER ACTION**

I. Waste Management Unit:

A. NOR No: **004**
Other Identifier: **SITE D – CELL #1**
Grid Locations: **E790000, N246750**

B. Description: **D80 – Asphalt Landfill (2.5 acres)**

C. Dates of Operation **1975-2003**

II. Waste Managed: **Asphalt**

III, Evidence of Release: **No evidence of release during investigation**

IV. Pollutant Dispersal Pathways: **Potential - Through unsaturated zone to aquifer, south along groundwater gradient to Beal's Creek**

V. Summary:

RFI Investigation Phase:	**Phase II, Subphase 4**
GW Investigation Report Approved:	**19-Jan-1995**
Soils Investigation Report Approved:	**12-Apr-2004**
APAR Approved:	**na**
CMS or RAP Approved:	**na**
CMI or RACR Approved:	**na**
NFA Issuance Letter:	**23-Jul-2003**

VI. Recommended Action: **No Further Action**

PRELIMINARY REVIEW UNIT CHECKLIST

Facility:	**Alon USA LP Big Spring Refinery**	City:	**Big Spring, Texas**
ISW Reg. No:	**SWR-30083**	Date:	**March 19, 2024**
Permit No:	**HW-50140**	Reviewer:	**Robert Sherrill, PG**
EPA ID No:	**TXD008013468**	Status:	**NO FURTHER ACTION**

I. Waste Management Unit:

A. NOR No: **004**
Other Identifier: **SITE D – CELL #2**
Grid Locations: **E790700, N246800**

B. Description: **D-80 – Asphalt Landfill (2.21 acres)**

C. Dates of Operation **1975-2003**

II. Waste Managed: **Bauxite, petroleum coke, rock, sand, gravel, spent treating clay, carbon absorbent, WW sludge, asphalt, tank bottoms, spill cleanup waste, spent FCC catalyst, Sand filter, absorbent wastes, calcium chloride, spent catalyst, Cooling tower wood, filter media, spent MTBE catalyst, ceramic bals, glass, spent activated alumina, antimony, arsenic, barium, cadmium, chromium, lead, nickel, silver, selenium**

III, Evidence of Release: **No evidence of release during investigation**

IV. Pollutant Dispersal Pathways: **Potential - Through unsaturated zone to aquifer, south along groundwater gradient to Beal's Creek**

V. Summary:

RFI Investigation Phase:	**Phase II, Subphase 4**
GW Investigation Report Approved:	**19-Jan-1995**
Soils Investigation Report Approved:	**12-Apr-2004**
APAR Approved:	**na**
CMS or RAP Approved:	**na**
CMI or RACR Approved:	**na**
NFA Issuance Letter:	**23-Jul-2003**

VI. Recommended Action: **No Further Action**

PRELIMINARY REVIEW UNIT CHECKLIST

Facility:	**Alon USA LP Big Spring Refinery**	City:	**Big Spring, Texas**
ISW Reg. No:	**SWR-30083**	Date:	**March 19, 2024**
Permit No:	**HW-50140**	Reviewer:	**Robert Sherrill, PG**
EPA ID No:	**TXD008013468**	Status:	**NO FURTHER ACTION**

I. Waste Management Unit:

A. NOR No: **004**
Other Identifier: **SITE D – CELL #3**
Grid Locations: **E790400, N246800**

B. Description: **D80 – Landfill (1.38 acres)**

C. Dates of Operation **1975-1985**

II. Waste Managed: **Spent treating clay, spent FCC catalyst, ceramic balls, antimony, arsenic, barium, cadmium, chromium, lead, nickel, selenium, silver**

III, Evidence of Release: **No evidence of release during investigation**

IV. Pollutant Dispersal Pathways: **Potential - Through unsaturated zone to aquifer, south along groundwater gradient to Beal's Creek**

V. Summary:

RFI Investigation Phase:	**Phase II, Subphase 4**
GW Investigation Report Approved:	**19-Jan-1995**
Soils Investigation Report Approved:	**12-Apr-2004**
APAR Approved:	**na**
CMS or RAP Approved:	**na**
CMI or RACR Approved:	**na**
NFA Issuance Letter:	**23-Jul-2003**

VI. Recommended Action: **No Further Action**

PRELIMINARY REVIEW UNIT CHECKLIST

Facility:	**Alon USA LP Big Spring Refinery**	City:	**Big Spring, Texas**
ISW Reg. No:	**SWR-30083**	Date:	**March 19, 2024**
Permit No:	**HW-50140**	Reviewer:	**Robert Sherrill, PG**
EPA ID No:	**TXD008013468**	Status:	**NO FURTHER ACTION**

I. Waste Management Unit:

A. NOR No: **004**
Other Identifier: **SITE D – CELL #4**
Grid Locations: **E790500, N246500**

B. Description: **D80 – Landfill (0.2 acres)**

C. Dates of Operation **1985-2003**

II. Waste Managed: **Spent FCC catalyst, antimony, arsenic, cadmium, chromium, lead, nickel, selenium, silver**

III, Evidence of Release: **No evidence of release during investigation**

IV. Pollutant Dispersal Pathways: **Potential - Through unsaturated zone to aquifer, south along groundwater gradient to Beal's Creek**

V. Summary:

RFI Investigation Phase:	**Phase II, Subphase 4**
GW Investigation Report Approved:	**19-Jan-1995**
Soils Investigation Report Approved:	**12-Apr-2004**
APAR Approved:	**na**
CMS or RAP Approved:	**na**
CMI or RACR Approved:	**na**
NFA Issuance Letter:	**23-Jul-2003**

VI. Recommended Action: **No Further Action**

PRELIMINARY REVIEW UNIT CHECKLIST

Facility:	**Alon USA LP Big Spring Refinery**	City:	**Big Spring, Texas**
ISW Reg. No:	**SWR-30083**	Date:	**March 19, 2024**
Permit No:	**HW-50140**	Reviewer:	**Robert Sherrill, PG**
EPA ID No:	**TXD008013468**	Status:	**NO FURTHER ACTION**

I. Waste Management Unit:

A. NOR No: **004**
Other Identifier: **SITE D – CELL #5**
Grid Locations: **E790100, N246400**

B. Description: **D80 – Landfill (0.2 acres)**

C. Dates of Operation **1986-2003**

II. Waste Managed: **Spent FCC catalyst, antimony, arsenic, cadmium, chromium, lead, nickel, selenium, silver**

III, Evidence of Release: **No evidence of release during investigation**

IV. Pollutant Dispersal Pathways: **Potential - Through unsaturated zone to aquifer, south along groundwater gradient to Beal's Creek**

V. Summary:

RFI Investigation Phase:	**Phase II, Subphase 4**
GW Investigation Report Approved:	**14-Aug-1996**
Soils Investigation Report Approved:	**14-Aug-1996**
APAR Approved:	**na**
CMS or RAP Approved:	**na**
CMI or RACR Approved:	**na**
NFA Issuance Letter:	**23-Jul-2003**

VI. Recommended Action: **No Further Action**

PRELIMINARY REVIEW UNIT CHECKLIST

Facility:	**Alon USA LP Big Spring Refinery**	City:	**Big Spring, Texas**
ISW Reg. No:	**SWR-30083**	Date:	**March 19, 2024**
Permit No:	**HW-50140**	Reviewer:	**Robert Sherrill, PG**
EPA ID No:	**TXD008013468**	Status:	**POST-CLOSURE CARE**

I. Waste Management Unit:

A. NOR No: **005**
Other Identifier: **SITE E**
Grid Locations: **E791100, N243250**

B. Description: **T04 – Other Treatment (8.09 acres)**

C. Dates of Operation **1976-1988**

II. Waste Managed: **Spent FCC catalyst, antimony, arsenic, barium, cadmium, chromium, lead, nickel, selenium, silver**

III, Evidence of Release: **No evidence of release during investigation**

IV. Pollutant Dispersal Pathways: **Potential - Through unsaturated zone to aquifer, south along groundwater gradient to Beal's Creek**

V. Summary:

RFI Investigation Phase:	**na – RCRA Unit**
GW Investigation Report Approved:	**na**
Soils Investigation Report Approved:	**na**
APAR Approved:	**na**
CMS or RAP Approved:	**3-Jun-1993**
CMI or RACR Approved:	**JUL-1995**
NFA Issuance Letter:	**ACTIVE**

VI. Recommended Action: **No Further Action**

PRELIMINARY REVIEW UNIT CHECKLIST

Facility:	**Alon USA LP Big Spring Refinery**	City:	**Big Spring, Texas**
ISW Reg. No:	**SWR-30083**	Date:	**March 19, 2024**
Permit No:	**HW-50140**	Reviewer:	**Robert Sherrill, PG**
EPA ID No:	**TXD008013468**	Status:	**ACTIVE**

I. Waste Management Unit:

A. NOR No: **007**
Other Identifier: **SITE F**
Grid Locations: **E790750, N243100**

B. Description: **D83 – Surface Impoundment (Unknown)**

C. Dates of Operation **Unknown-Present (Active Unit)**

II. Waste Managed: **Asphalt**

III, Evidence of Release: **No evidence of release during investigation**

IV. Pollutant Dispersal Pathways: **Potential - Through unsaturated zone to aquifer, south along groundwater gradient to Beal's Creek**

V. Summary:

RFI Investigation Phase:	**na – RCRA Unit**
GW Investigation Report Approved:	**na**
Soils Investigation Report Approved:	**na**
APAR Approved:	**na**
CMS or RAP Approved:	**na**
CMI or RACR Approved:	**na**
NFA Issuance Letter:	**Active**

VI. Recommended Action: **Active**

PRELIMINARY REVIEW UNIT CHECKLIST

Facility:	**Alon USA LP Big Spring Refinery**	City:	**Big Spring, Texas**
ISW Reg. No:	**SWR-30083**	Date:	**March 19, 2024**
Permit No:	**HW-50140**	Reviewer:	**Robert Sherrill, PG**
EPA ID No:	**TXD008013468**	Status:	**NO FURTHER ACTION**

I. Waste Management Unit:

A. NOR No: **009**
Other Identifier: **SITE G**
Grid Locations: **E791600 , N244200**

B. Description: **D81 – Land Demonstration Plot (0.3 acres)**

C. Dates of Operation **1988**

II. Waste Managed: **Ignitable spill cleanup, petroleum products, primary/secondary oil/water/solids separation sludges**

III, Evidence of Release: **No evidence of release during investigation**

IV. Pollutant Dispersal Pathways: **Potential - Through unsaturated zone to aquifer, south along groundwater gradient to Beal's Creek**

V. Summary:

RFI Investigation Phase:	**na – RCRA Unit**
GW Investigation Report Approved:	**na**
Soils Investigation Report Approved:	**na**
APAR Approved:	**na**
CMS or RAP Approved:	**na**
CMI or RACR Approved:	**na**
NFA Issuance Letter:	**Post Closure**

VI. Recommended Action: **No Further Action**

PRELIMINARY REVIEW UNIT CHECKLIST

Facility:	**Alon USA LP Big Spring Refinery**	City:	**Big Spring, Texas**
ISW Reg. No:	**SWR-30083**	Date:	**March 19, 2024**
Permit No:	**HW-50140**	Reviewer:	**Robert Sherrill, PG**
EPA ID No:	**TXD008013468**	Status:	**POST-CLOSURE CARE**

I. Waste Management Unit:

A. NOR No: **010**
Other Identifier: **SITE H**
Grid Locations: **E790400, N247500**

B. Description: **T04 – Other Treatment (5 acres)**

C. Dates of Operation **1989-1994**

II. Waste Managed: **Ignitable spill cleanup, petroleum products, primary/secondary oil/water/solids separation sludges**

III, Evidence of Release: **No evidence of release during investigation**

IV. Pollutant Dispersal Pathways: **Potential - Through unsaturated zone to aquifer, south along groundwater gradient to Beal's Creek**

V. Summary:

RFI Investigation Phase:	**na – RCRA Unit**
GW Investigation Report Approved:	**na**
Soils Investigation Report Approved:	**na**
APAR Approved:	**4-Dec-2006**
CMS or RAP Approved:	**2002**
CMI or RACR Approved:	**9-Jun-2004**
NFA Issuance Letter:	**ACTIVE**

VI. Recommended Action: **POST-CLOSURE CARE**

PRELIMINARY REVIEW UNIT CHECKLIST

Facility:	**Alon USA LP Big Spring Refinery**	City:	**Big Spring, Texas**
ISW Reg. No:	**SWR-30083**	Date:	**March 19, 2024**
Permit No:	**HW-50140**	Reviewer:	**Robert Sherrill, PG**
EPA ID No:	**TXD008013468**	Status:	**ACTIVE**

I. Waste Management Unit:

A. NOR No: **013**
Other Identifier: **SITE J**
Grid Locations: **E789560, N247700**

B. Description: **D80 – Landfill (5.5 acres)**

C. Dates of Operation **1992-Present (Active Unit)**

II. Waste Managed: **Spent activated alumina, petroleum coke, rock, sand, gravel, spent treating clay, oily sludge, spent carbon, production refuse, water treatment sludge, NHz spill cleanup, spent FCC catalyst, sulfur, cooling tower wood, debris, ceramic balls, biological sludge from WWTP, refractory waste, metal scale and fillings, NHz soil, boiler blowdown mud, tank bottoms petroleum products, spent hydrotreating catalyst, salts, metal salts, bauxite**

III, Evidence of Release: **No evidence of release during investigation**

IV. Pollutant Dispersal Pathways: **Potential - Through unsaturated zone to aquifer, south along groundwater gradient to Beal's Creek**

V. Summary:

RFI Investigation Phase:	**na – RCRA Unit**
GW Investigation Report Approved:	**na**
Soils Investigation Report Approved:	**na**
APAR Approved:	**na**
CMS or RAP Approved:	**na**
CMI or RACR Approved:	**na**
NFA Issuance Letter:	**ACTIVE**

VI. Recommended Action: **Active**

PRELIMINARY REVIEW UNIT CHECKLIST

Facility:	**Alon USA LP Big Spring Refinery**	City:	**Big Spring, Texas**
ISW Reg. No:	**SWR-30083**	Date:	**March 19, 2024**
Permit No:	**HW-50140**	Reviewer:	**Robert Sherrill, PG**
EPA ID No:	**TXD008013468**	Status:	**ACTIVE**

I. Waste Management Unit:

A. NOR No: **012**
Other Identifier: **SITE K**
Grid Locations: **E789400, N247200**

B. Description: **D80 – Landfill (4.47 acres)**

C. Dates of Operation **Unknown-Present (Active Unit)**

II. Waste Managed: **Concrete**

III, Evidence of Release: **No evidence of release during investigation**

IV. Pollutant Dispersal Pathways: **Potential - Through unsaturated zone to aquifer, south along groundwater gradient to Beal's Creek**

V. Summary:

RFI Investigation Phase:	**na – RCRA Unit**
GW Investigation Report Approved:	**na**
Soils Investigation Report Approved:	**na**
APAR Approved:	**na**
CMS or RAP Approved:	**na**
CMI or RACR Approved:	**na**
NFA Issuance Letter:	**ACTIVE**

VI. Recommended Action: **Active**

PRELIMINARY REVIEW UNIT CHECKLIST

Facility:	**Alon USA LP Big Spring Refinery**	City:	**Big Spring, Texas**
ISW Reg. No:	**SWR-30083**	Date:	**March 19, 2024**
Permit No:	**HW-50140**	Reviewer:	**Robert Sherrill, PG**
EPA ID No:	**TXD008013468**	Status:	**ACTIVE**

I. Waste Management Unit:

A. NOR No: **014**
Other Identifier: **SITE L**
Grid Locations: **E787600, N244750**

B. Description: **D80 – Landfill (1.55 acres)**

C. Dates of Operation **Unknown-Present (Active**

II. Waste Managed: **Asbestos**

III, Evidence of Release: **No evidence of release during investigation**

IV. Pollutant Dispersal Pathways: **Potential - Through unsaturated zone to aquifer, south along groundwater gradient to Beal's Creek**

V. Summary:

RFI Investigation Phase:	**na – RCRA Unit**
GW Investigation Report Approved:	**na**
Soils Investigation Report Approved:	**na**
APAR Approved:	**na**
CMS or RAP Approved:	**na**
CMI or RACR Approved:	**na**
NFA Issuance Letter:	**ACTIVE**

VI. Recommended Action: **Active**

PRELIMINARY REVIEW UNIT CHECKLIST

Facility:	**Alon USA LP Big Spring Refinery**	City:	**Big Spring, Texas**
ISW Reg. No:	**SWR-30083**	Date:	**March 19, 2024**
Permit No:	**HW-50140**	Reviewer:	**Robert Sherrill, PG**
EPA ID No:	**TXD008013468**	Status:	**NO FURTHER ACTION**

I. Waste Management Unit:

A. NOR No: **na**
Other Identifier: **SITE LF-1**
Grid Locations: **E789000, N247750**

B. Description: **D80 – Landfill (Unknown)**

C. Dates of Operation **Unknown**

II. Waste Managed: **Polystyrene resin, polyisobutylene polymer, ethylbenzene, styrene**

III, Evidence of Release: **No evidence of release during investigation**

IV. Pollutant Dispersal Pathways: **Potential - Through unsaturated zone to aquifer, south along groundwater gradient to Beal's Creek**

V. Summary:

RFI Investigation Phase:	**Phase II, Subphase 4**
GW Investigation Report Approved:	**19-Oct-1993**
Soils Investigation Report Approved:	**9-Jan-2006**
APAR Approved:	**na**
CMS or RAP Approved:	**na**
CMI or RACR Approved:	**23-Jul-2003**
NFA Issuance Letter:	**30-May-2007**

VI. Recommended Action: **No Further Action**

PRELIMINARY REVIEW UNIT CHECKLIST

Facility:	**Alon USA LP Big Spring Refinery**	City:	**Big Spring, Texas**
ISW Reg. No:	**SWR-30083**	Date:	**March 19, 2024**
Permit No:	**HW-50140**	Reviewer:	**Robert Sherrill, PG**
EPA ID No:	**TXD008013468**	Status:	**NO FURTHER ACTION**

I. Waste Management Unit:

A. NOR No: **na**
Other Identifier: **TANK T-176**
Grid Locations: **E790200, N241400**

B. Description: **S02 – Tank (360,000 gallons)**

C. Dates of Operation **1929-2000**

II. Waste Managed: **Slop oil emulsion from API separator system and recycled slop oil from Tank T-176**

III, Evidence of Release: **No evidence of release during investigation**

IV. Pollutant Dispersal Pathways: **Potential - Through unsaturated zone to aquifer, south along groundwater gradient to Beal's Creek**

V. Summary:

RFI Investigation Phase:	**Group 4**
GW Investigation Report Approved:	**19-Oct-1993**
Soils Investigation Report Approved:	**9-Jan-2006**
APAR Approved:	**9-Jan-2006**
CMS or RAP Approved:	**3-Jan-2006**
CMI or RACR Approved:	**30-May-2007**
NFA Issuance Letter:	**30-May-2007**

VI. Recommended Action: **No Further Action**

PRELIMINARY REVIEW UNIT CHECKLIST

Facility:	**Alon USA LP Big Spring Refinery**	City:	**Big Spring, Texas**
ISW Reg. No:	**SWR-30083**	Date:	**March 19, 2024**
Permit No:	**HW-50140**	Reviewer:	**Robert Sherrill, PG**
EPA ID No:	**TXD008013468**	Status:	**NO FURTHER ACTION**

I. Waste Management Unit:

A. NOR No: **na**
Other Identifier: **TANK T-38**
Grid Locations: **E792400, N241800**

B. Description: **T01 – Caustic Tank (21,000 gallons)**

C. Dates of Operation **1978-Present (Active Unit)**

II. Waste Managed: **Spent caustic from FCCU gasoline treater system prior to sale or re-use of the spent caustic**

III, Evidence of Release: **No evidence of release during investigation**

IV. Pollutant Dispersal Pathways: **Potential - Through unsaturated zone to aquifer, south along groundwater gradient to Beal's Creek**

V. Summary:

RFI Investigation Phase:	**Group 4**
GW Investigation Report Approved:	**19-Oct-1993**
Soils Investigation Report Approved:	**9-Jan-2006**
APAR Approved:	**9-Jan-2006**
CMS or RAP Approved:	**3-Jan-2006**
CMI or RACR Approved:	**30-May-2007**
NFA Issuance Letter:	**30-May-2007**

VI. Recommended Action: **No Further Action**

PRELIMINARY REVIEW UNIT CHECKLIST

Facility:	**Alon USA LP Big Spring Refinery**	City:	**Big Spring, Texas**
ISW Reg. No:	**SWR-30083**	Date:	**March 19, 2024**
Permit No:	**HW-50140**	Reviewer:	**Robert Sherrill, PG**
EPA ID No:	**TXD008013468**	Status:	**NO FURTHER ACTION**

I. Waste Management Unit:

A. NOR No: **na**
Other Identifier: **TANK T-52**
Grid Locations: **E790200, N241450**

B. Description: **S02 – Tank (42,000 gallons)**

C. Dates of Operation **1978-1992**

II. Waste Managed: **Oil skimmings from WW treatment units and slop oil recycle streams, excess flow from T-52**

III, Evidence of Release: **No evidence of release during investigation**

IV. Pollutant Dispersal Pathways: **Potential - Through unsaturated zone to aquifer, south along groundwater gradient to Beal's Creek**

V. Summary:

RFI Investigation Phase:	**Group 4**
GW Investigation Report Approved:	**19-Oct-1993**
Soils Investigation Report Approved:	**9-Jan-2006**
APAR Approved:	**9-Jan-2006**
CMS or RAP Approved:	**3-Jan-2006**
CMI or RACR Approved:	**30-May-2007**
NFA Issuance Letter:	**30-May-2007**

VI. Recommended Action: **No Further Action**

PRELIMINARY REVIEW UNIT CHECKLIST

Facility:	**Alon USA LP Big Spring Refinery**	City:	**Big Spring, Texas**
ISW Reg. No:	**SWR-30083**	Date:	**March 19, 2024**
Permit No:	**HW-50140**	Reviewer:	**Robert Sherrill, PG**
EPA ID No:	**TXD008013468**	Status:	**NO FURTHER ACTION**

I. Waste Management Unit:

A. NOR No: **na**
Other Identifier: **V2**
Grid Locations: **E790200, N241300**

B. Description: **T01 – Surge Tank (25,000 gallons)**

C. Dates of Operation **1953-1980**

II. Waste Managed: **WW effluent from API separator system, recycled effluent from T-176, effluent from Polystyrene unit**

III, Evidence of Release: **No evidence of release during investigation**

IV. Pollutant Dispersal Pathways: **Potential - Through unsaturated zone to aquifer, south along groundwater gradient to Beal's Creek**

V. Summary:

RFI Investigation Phase:	**Group 4**
GW Investigation Report Approved:	**19-Oct-1993**
Soils Investigation Report Approved:	**9-Jan-2006**
APAR Approved:	**9-Jan-2006**
CMS or RAP Approved:	**3-Jan-2006**
CMI or RACR Approved:	**30-May-2007**
NFA Issuance Letter:	**30-May-2007**

VI. Recommended Action: **No Further Action**

PRELIMINARY REVIEW UNIT CHECKLIST

Facility:	**Alon USA LP Big Spring Refinery**	City:	**Big Spring, Texas**
ISW Reg. No:	**SWR-30083**	Date:	**March 19, 2024**
Permit No:	**HW-50140**	Reviewer:	**Robert Sherrill, PG**
EPA ID No:	**TXD008013468**	Status:	**NO FURTHER ACTION**

I. Waste Management Unit:

A. NOR No: **na**
Other Identifier: **V3**
Grid Locations: **E790200, N241300**

B. Description: **T04 – Clarifier (29,000 gallons)**

C. Dates of Operation **1953-1980**

II. Waste Managed: **Effluent from V-2**

III, Evidence of Release: **No evidence of release during investigation**

IV. Pollutant Dispersal Pathways: **Potential - Through unsaturated zone to aquifer, south along groundwater gradient to Beal's Creek**

V. Summary:

RFI Investigation Phase:	**Group 4**
GW Investigation Report Approved:	**19-Oct-1993**
Soils Investigation Report Approved:	**9-Jan-2006**
APAR Approved:	**9-Jan-2006**
CMS or RAP Approved:	**3-Jan-2006**
CMI or RACR Approved:	**30-May-2007**
NFA Issuance Letter:	**30-May-2007**

VI. Recommended Action: **No Further Action**

PRELIMINARY REVIEW UNIT CHECKLIST

Facility:	**Alon USA LP Big Spring Refinery**	City:	**Big Spring, Texas**
ISW Reg. No:	**SWR-30083**	Date:	**March 19, 2024**
Permit No:	**HW-50140**	Reviewer:	**Robert Sherrill, PG**
EPA ID No:	**TXD008013468**	Status:	**NO FURTHER ACTION**

I. Waste Management Unit:

A. NOR No: **na**
Other Identifier: **V4**
Grid Locations: **E790100, N241300**

B. Description: **S02 – Tank (5,000 gallons)**

C. Dates of Operation **1953-1980**

II. Waste Managed: **Primary WW and API separator sludges**

III, Evidence of Release: **No evidence of release during investigation**

IV. Pollutant Dispersal Pathways: **Potential - Through unsaturated zone to aquifer, south along groundwater gradient to Beal's Creek**

V. Summary:

RFI Investigation Phase:	**Group 4**
GW Investigation Report Approved:	**19-Oct-1993**
Soils Investigation Report Approved:	**9-Jan-2006**
APAR Approved:	**9-Jan-2006**
CMS or RAP Approved:	**3-Jan-2006**
CMI or RACR Approved:	**30-May-2007**
NFA Issuance Letter:	**30-May-2007**

VI. Recommended Action: **No Further Action**

PRELIMINARY REVIEW UNIT CHECKLIST

Facility:	**Alon USA LP Big Spring Refinery**	City:	**Big Spring, Texas**
ISW Reg. No:	**SWR-30083**	Date:	**March 19, 2024**
Permit No:	**HW-50140**	Reviewer:	**Robert Sherrill, PG**
EPA ID No:	**TXD008013468**	Status:	**NO FURTHER ACTION**

I. Waste Management Unit:

A. NOR No: **na**
Other Identifier: **VFD-1**
Grid Locations: **E790100, N241450**

B. Description: **S99 – Dumpster (4 cubic yards)**

C. Dates of Operation **1980-1991**

II. Waste Managed: **Filter cake media waste from rotary vacuum filter system (slop oil emulsions)**

III, Evidence of Release: **No evidence of release during investigation**

IV. Pollutant Dispersal Pathways: **Potential - Through unsaturated zone to aquifer, south along groundwater gradient to Beal's Creek**

V. Summary: **RFI: Group 4**
Groundwater Investigation Report Approved – January 19, 1995
Soils Investigation Report Approved – January 19, 1995
APAR Approved – January 09, 2006
CMS or RAP Approved – January 01, 2006
CMI or RACR Approved – May 30, 2007
No Further Action Approval – May 30, 2007

VI. Recommended Action: **No Further Action**

V. Summary:

RFI Investigation Phase:	**Group 4**
GW Investigation Report Approved:	**19-Jan-1995**
Soils Investigation Report Approved:	**2-Feb-2001**
APAR Approved:	**9-Jan-2006**
CMS or RAP Approved:	**3-Jan-2006**
CMI or RACR Approved:	**30-May-2007**
NFA Issuance Letter:	**2-Feb-2001**

VI. Recommended Action: **No Further Action**

PRELIMINARY REVIEW UNIT CHECKLIST

Facility:	**Alon USA LP Big Spring Refinery**	City:	**Big Spring, Texas**
ISW Reg. No:	**SWR-30083**	Date:	**March 19, 2024**
Permit No:	**HW-50140**	Reviewer:	**Robert Sherrill, PG**
EPA ID No:	**TXD008013468**	Status:	**NO FURTHER ACTION**

I. Waste Management Unit:

A. NOR No: **na**
Other Identifier: **W-1**
Grid Locations: **E788400, N245300**

B. Description: **T02 – Surface Impoundment (0.09 acres)**

C. Dates of Operation **1957-1972**

II. Waste Managed: **Surface run-off and overflow from WP-4, chromium, phenols**

III, Evidence of Release: **No evidence of release during investigation**

IV. Pollutant Dispersal Pathways: **Potential - Through unsaturated zone to aquifer, south along groundwater gradient to Beal's Creek**

V. Summary:

RFI Investigation Phase:	**Phase 1, Subphase 4**
GW Investigation Report Approved:	**19-Jan-1995**
Soils Investigation Report Approved:	**2-Feb-2001**
APAR Approved:	**na**
CMS or RAP Approved:	**24-May-2000**
CMI or RACR Approved:	**2-Feb-2001**
NFA Issuance Letter:	**2-Feb-2001**

VI. Recommended Action: **No Further Action**

PRELIMINARY REVIEW UNIT CHECKLIST

Facility:	**Alon USA LP Big Spring Refinery**	City:	**Big Spring, Texas**
ISW Reg. No:	**SWR-30083**	Date:	**March 19, 2024**
Permit No:	**HW-50140**	Reviewer:	**Robert Sherrill, PG**
EPA ID No:	**TXD008013468**	Status:	**NO FURTHER ACTION**

I. Waste Management Unit:

A. NOR No: **na**
Other Identifier: **W-2**
Grid Locations: **E788400, N245350**

B. Description: **T02 – Surface Impoundment (0.08 acres)**

C. Dates of Operation **1957-1972**

II. Waste Managed: **Water from WP-3 & WP-4B, arsenic, barium, cadmium, chromium, lead, nickel, selenium, cyanide, benzene, toluene, acrylonitrile, benzidene, bis(2-ethylhexyl)phthalate, di(n)butyl phthalate, diethyl phthalate, Di(n)octyl phthalate, methylene chloride**

III, Evidence of Release: **No evidence of release during investigation**

IV. Pollutant Dispersal Pathways: **Potential - Through unsaturated zone to aquifer, south along groundwater gradient to Beal's Creek**

V. Summary:

RFI Investigation Phase:	**Phase 1, Subphase 4**
GW Investigation Report Approved:	**19-Jan-1995**
Soils Investigation Report Approved:	**2-Feb-2001**
APAR Approved:	**na**
CMS or RAP Approved:	**24-May-2000**
CMI or RACR Approved:	**2-Feb-2001**
NFA Issuance Letter:	**2-Feb-2001**

VI. Recommended Action: **No Further Action**

PRELIMINARY REVIEW UNIT CHECKLIST

Facility:	**Alon USA LP Big Spring Refinery**	City:	**Big Spring, Texas**
ISW Reg. No:	**SWR-30083**	Date:	**March 19, 2024**
Permit No:	**HW-50140**	Reviewer:	**Robert Sherrill, PG**
EPA ID No:	**TXD008013468**	Status:	**NO FURTHER ACTION**

I. Waste Management Unit:

A. NOR No: **na**
Other Identifier: **W-3**
Grid Locations: **E788400, N245400**

B. Description: **T02 – Surface Impoundment (0.08 acres)**

C. Dates of Operation **1957-1972**

II. Waste Managed: **Styrene tar, naphthalene, styrene**

III, Evidence of Release: **No evidence of release during investigation**

IV. Pollutant Dispersal Pathways: **Potential - Through unsaturated zone to aquifer, south along groundwater gradient to Beal's Creek**

V. Summary:

RFI Investigation Phase:	**Phase 1, Subphase 4**
GW Investigation Report Approved:	**19-Jan-1995**
Soils Investigation Report Approved:	**2-Feb-2001**
APAR Approved:	**na**
CMS or RAP Approved:	**24-May-2000**
CMI or RACR Approved:	**2-Feb-2001**
NFA Issuance Letter:	**11-Apr-2005**

VI. Recommended Action: **No Further Action**

PRELIMINARY REVIEW UNIT CHECKLIST

Facility:	**Alon USA LP Big Spring Refinery**	City:	**Big Spring, Texas**
ISW Reg. No:	**SWR-30083**	Date:	**March 19, 2024**
Permit No:	**HW-50140**	Reviewer:	**Robert Sherrill, PG**
EPA ID No:	**TXD008013468**	Status:	**NO FURTHER ACTION**

I. Waste Management Unit:

A. NOR No: **na**
Other Identifier: **W-4**
Grid Locations: **E788400, N245450**

B. Description: **T02 – Surface Impoundment (0.10 acres)**

C. Dates of Operation **1957-1972**

II. Waste Managed: **Styrene tar, naphthalene, styrene**

III, Evidence of Release: **No evidence of release during investigation**

IV. Pollutant Dispersal Pathways: **Potential - Through unsaturated zone to aquifer, south along groundwater gradient to Beal's Creek**

V. Summary: **RFI: Phase 1, Subphase 4**
Groundwater Investigation Report Approved – January 19, 1995
Soils Investigation Report Approved – February 25, 1999
APAR Approved – na
CMS or RAP Approved – May 24, 2000
CMI or RACR Approved – February 02, 2001
No Further Action Approval – April 11, 2005

VI. Recommended Action: **No Further Action**

V. Summary:

RFI Investigation Phase:	**Phase 1, Subphase 4**
GW Investigation Report Approved:	**19-Jan-1995**
Soils Investigation Report Approved:	**2-Feb-2001**
APAR Approved:	**na**
CMS or RAP Approved:	**24-May-2000**
CMI or RACR Approved:	**2-Feb-2001**
NFA Issuance Letter:	**2-Feb-2001**

VI. Recommended Action: **No Further Action**

PRELIMINARY REVIEW UNIT CHECKLIST

Facility:	**Alon USA LP Big Spring Refinery**	City:	**Big Spring, Texas**
ISW Reg. No:	**SWR-30083**	Date:	**March 19, 2024**
Permit No:	**HW-50140**	Reviewer:	**Robert Sherrill, PG**
EPA ID No:	**TXD008013468**	Status:	**NO FURTHER ACTION**

I. Waste Management Unit:

A. NOR No: **na**
Other Identifier: **W-5**
Grid Locations: **E788600, N245450**

B. Description: **T02 – Surface Impoundment (0.08 acres)**

C. Dates of Operation **1957-1972**

II. Waste Managed: **Styrene tar, naphthalene, styrene**

III, Evidence of Release: **No evidence of release during investigation**

IV. Pollutant Dispersal Pathways: **Potential - Through unsaturated zone to aquifer, south along groundwater gradient to Beal's Creek**

V. Summary:

RFI Investigation Phase:	**Phase 1, Subphase 4**
GW Investigation Report Approved:	**19-Jan-1995**
Soils Investigation Report Approved:	**12-Apr-2004**
APAR Approved:	**na**
CMS or RAP Approved:	**24-May-2000**
CMI or RACR Approved:	**2-Feb-2001**
NFA Issuance Letter:	**23-Jul-2003**

VI. Recommended Action: **No Further Action**

PRELIMINARY REVIEW UNIT CHECKLIST

Facility:	**Alon USA LP Big Spring Refinery**	City:	**Big Spring, Texas**
ISW Reg. No:	**SWR-30083**	Date:	**March 19, 2024**
Permit No:	**HW-50140**	Reviewer:	**Robert Sherrill, PG**
EPA ID No:	**TXD008013468**	Status:	**NO FURTHER ACTION**

I. Waste Management Unit:

A. NOR No: **na**
Other Identifier: **WASTE PILE**
Grid Locations: **E790100, N244500**

B. Description: **S03 – Waste Pile (0.45 acres)**

C. Dates of Operation **1976-1989**

II. Waste Managed: **Various spent catalysts, bauxite, petroleum coke, rock, sand, gravel, spent treating clay, carbon absorbent, sulfur, ceramic balls, spent activated alumina**

III, Evidence of Release: **No evidence of release during investigation**

IV. Pollutant Dispersal Pathways: **Potential - Through unsaturated zone to aquifer, south along groundwater gradient to Beal's Creek**

V. Summary:

RFI Investigation Phase:	**Phase II, Subphase 4**
GW Investigation Report Approved:	**19-Oct-1993**
Soils Investigation Report Approved:	**9-Jan-2006**
APAR Approved:	**na**
CMS or RAP Approved:	**na**
CMI or RACR Approved:	**na**
NFA Issuance Letter:	**30-May-2007**

VI. Recommended Action: **No Further Action**

PRELIMINARY REVIEW UNIT CHECKLIST

Facility:	**Alon USA LP Big Spring Refinery**	City:	**Big Spring, Texas**
ISW Reg. No:	**SWR-30083**	Date:	**March 19, 2024**
Permit No:	**HW-50140**	Reviewer:	**Robert Sherrill, PG**
EPA ID No:	**TXD008013468**	Status:	**NO FURTHER ACTION**

I. Waste Management Unit:

A. NOR No: **na**
Other Identifier: **WP-1**
Grid Locations: **E790250, N241100**

B. Description: **T02 – Surface Impoundment (1.05 acres)**

C. Dates of Operation **1966-1976**

II. Waste Managed: **Surface run-off and overflow from WP-4, chromium, phenols**

III, Evidence of Release: **No evidence of release during investigation**

IV. Pollutant Dispersal Pathways: **Potential - Through unsaturated zone to aquifer, south along groundwater gradient to Beal's Creek**

V. Summary:

RFI Investigation Phase:	**Group 3**
GW Investigation Report Approved:	**19-Oct-1993**
Soils Investigation Report Approved:	**9-Jan-2006**
APAR Approved:	**9-Jan-2006**
CMS or RAP Approved:	**3-Jan-2006**
CMI or RACR Approved:	**30-May-2007**
NFA Issuance Letter:	**15-Dec-1993**

VI. Recommended Action: **No Further Action**

PRELIMINARY REVIEW UNIT CHECKLIST

Facility:	**Alon USA LP Big Spring Refinery**	City:	**Big Spring, Texas**
ISW Reg. No:	**SWR-30083**	Date:	**March 19, 2024**
Permit No:	**HW-50140**	Reviewer:	**Robert Sherrill, PG**
EPA ID No:	**TXD008013468**	Status:	**NO FURTHER ACTION**

I. Waste Management Unit:

A. NOR No: **na**
Other Identifier: **WP-2**
Grid Locations: **E790100, N241000**

B. Description: **T02 – Surface Impoundment (2.24 acres)**

C. Dates of Operation **1975-1993**

II. Waste Managed: **Water from WP-3 & WP-4B, arsenic, barium, cadmium, chromium, lead, nickel, selenium, cyanide, benzene, toluene, acrylonitrile, benzidene, bis(2-ethylhexyl)phthalate, di(n)butyl phthalate, diethyl phthalate, Di(n)octyl phthalate, methylene chloride**

III, Evidence of Release: **No evidence of release during investigation**

IV. Pollutant Dispersal Pathways: **Potential - Through unsaturated zone to aquifer, south along groundwater gradient to Beal's Creek**

V. Summary:

RFI Investigation Phase:	**Group 3**
GW Investigation Report Approved:	**19-Oct-1993**
Soils Investigation Report Approved:	**9-Jan-2006**
APAR Approved:	**na**
CMS or RAP Approved:	**10-Jul-1992**
CMI or RACR Approved:	**15-Dec-1993**
NFA Issuance Letter:	**30-May-2007**

VI. Recommended Action: **No Further Action**

PRELIMINARY REVIEW UNIT CHECKLIST

Facility:	**Alon USA LP Big Spring Refinery**	City:	**Big Spring, Texas**
ISW Reg. No:	**SWR-30083**	Date:	**March 19, 2024**
Permit No:	**HW-50140**	Reviewer:	**Robert Sherrill, PG**
EPA ID No:	**TXD008013468**	Status:	**NO FURTHER ACTION**

I. Waste Management Unit:

A. NOR No: **na**
Other Identifier: **WP-3**
Grid Locations: **E790000, N241100**

B. Description: **S02 – Concrete Tank (4.08 acres)**

C. Dates of Operation **1976-Present (Active Unit)**

II. Waste Managed: **Water from API separator, WP-4, WP-3A, WP-3B, recycle water from WP-6, contaminated stormwater, chromium, barium, cadmium, lead, nickel, selenium, antimony, cyanide, phenol, benzidene, toluene**

III, Evidence of Release: **No evidence of release during investigation**

IV. Pollutant Dispersal Pathways: **Potential - Through unsaturated zone to aquifer, south along groundwater gradient to Beal's Creek**

V. Summary:

RFI Investigation Phase:	**Group 3**
GW Investigation Report Approved:	**19-Oct-1993**
Soils Investigation Report Approved:	**9-Jan-2006**
APAR Approved:	**9-Jan-2006**
CMS or RAP Approved:	**3-Jan-2006**
CMI or RACR Approved:	**30-May-2007**
NFA Issuance Letter:	**30-May-2007**

VI. Recommended Action: **No Further Action**

PRELIMINARY REVIEW UNIT CHECKLIST

Facility:	**Alon USA LP Big Spring Refinery**	City:	**Big Spring, Texas**
ISW Reg. No:	**SWR-30083**	Date:	**March 19, 2024**
Permit No:	**HW-50140**	Reviewer:	**Robert Sherrill, PG**
EPA ID No:	**TXD008013468**	Status:	**NO FURTHER ACTION**

I. Waste Management Unit:

A. NOR No: **na**
Other Identifier: **WP-3A**
Grid Locations: **E790050, N241250**

B. Description: **S02 – Concrete Tank (0.03 acres)**

C. Dates of Operation **1990**

II. Waste Managed: **Water from API separator, prior to discharge into WP-3, chromium, phenol**

III, Evidence of Release: **No evidence of release during investigation**

IV. Pollutant Dispersal Pathways: **Potential - Through unsaturated zone to aquifer, south along groundwater gradient to Beal's Creek**

V. Summary:

RFI Investigation Phase:	**Group 3**
GW Investigation Report Approved:	**19-Oct-1993**
Soils Investigation Report Approved:	**9-Jan-2006**
APAR Approved:	**9-Jan-2006**
CMS or RAP Approved:	**3-Jan-2006**
CMI or RACR Approved:	**30-May-2007**
NFA Issuance Letter:	**30-May-2007**

VI. Recommended Action: **No Further Action**

PRELIMINARY REVIEW UNIT CHECKLIST

Facility:	**Alon USA LP Big Spring Refinery**	City:	**Big Spring, Texas**
ISW Reg. No:	**SWR-30083**	Date:	**March 19, 2024**
Permit No:	**HW-50140**	Reviewer:	**Robert Sherrill, PG**
EPA ID No:	**TXD008013468**	Status:	**NO FURTHER ACTION**

I. Waste Management Unit:

A. NOR No: **na**
Other Identifier: **WP-3B**
Grid Locations: **E789900, N241200**

B. Description: **S02 – Concrete Tank (0.03 acres)**

C. Dates of Operation **1978-Present (Active Unit)**

II. Waste Managed: **Water from API separator, treated effluent from WW treater, water from WP-6, chromium, barium, cadmium, lead, nickel, selenium, antimony, cyanide, phenol, benzidene, toluene, water flooding system**

III, Evidence of Release: **No evidence of release during investigation**

IV. Pollutant Dispersal Pathways: **Potential - Through unsaturated zone to aquifer, south along groundwater gradient to Beal's Creek**

V. Summary:

RFI Investigation Phase:	**Group 3**
GW Investigation Report Approved:	**19-Oct-1993**
Soils Investigation Report Approved:	**9-Jan-2006**
APAR Approved:	**9-Jan-2006**
CMS or RAP Approved:	**3-Jan-2006**
CMI or RACR Approved:	**30-May-2007**
NFA Issuance Letter:	**30-May-2007**

VI. Recommended Action: **No Further Action**

PRELIMINARY REVIEW UNIT CHECKLIST

Facility:	**Alon USA LP Big Spring Refinery**	City:	**Big Spring, Texas**
ISW Reg. No:	**SWR-30083**	Date:	**March 19, 2024**
Permit No:	**HW-50140**	Reviewer:	**Robert Sherrill, PG**
EPA ID No:	**TXD008013468**	Status:	**NO FURTHER ACTION**

I. Waste Management Unit:

A. NOR No: **na**
Other Identifier: **WP-4**
Grid Locations: **E790400, N241300**

B. Description: **S02 – Concrete Tank (0.12 acres)**

C. Dates of Operation **1978-1992**

II. Waste Managed: **Boiler, cooling tower, and raw water treatment blowdown prior to WP-3, barium, chromium, lead, toluene**

III, Evidence of Release: **No evidence of release during investigation**

IV. Pollutant Dispersal Pathways: **Potential - Through unsaturated zone to aquifer, south along groundwater gradient to Beal's Creek**

V. Summary:

RFI Investigation Phase:	**Group 3**
GW Investigation Report Approved:	**19-Oct-1993**
Soils Investigation Report Approved:	**9-Jan-2006**
APAR Approved:	**9-Jan-2006**
CMS or RAP Approved:	**3-Jan-2006**
CMI or RACR Approved:	**30-May-2007**
NFA Issuance Letter:	**30-May-2007**

VI. Recommended Action: **No Further Action**

PRELIMINARY REVIEW UNIT CHECKLIST

Facility:	**Alon USA LP Big Spring Refinery**	City:	**Big Spring, Texas**
ISW Reg. No:	**SWR-30083**	Date:	**March 19, 2024**
Permit No:	**HW-50140**	Reviewer:	**Robert Sherrill, PG**
EPA ID No:	**TXD008013468**	Status:	**NO FURTHER ACTION**

I. Waste Management Unit:

A. NOR No: **na**
Other Identifier: **WP-4A**
Grid Locations: **E790250, N241400**

B. Description: **T02 – Surface Impoundment (0.33 acres)**

C. Dates of Operation **1980**

II. Waste Managed: **Runoff from west and central facility, western portion of tank farm, prior to WP-3, chromium, phenols**

III, Evidence of Release: **No evidence of release during investigation**

IV. Pollutant Dispersal Pathways: **Potential - Through unsaturated zone to aquifer, south along groundwater gradient to Beal's Creek**

V. Summary: **RFI: Group 3**
Groundwater Investigation Report Approved – na
Soils Investigation Report Approved – July 10, 1992
APAR Approved – January 09, 2006
CMS or RAP Approved – January 01, 2006
CMI or RACR Approved – May 30, 2007
No Further Action Approval – May 30, 2007

VI. Recommended Action: **No Further Action**

V. Summary:

RFI Investigation Phase:	**Group 3**
GW Investigation Report Approved:	**19-Oct-1993**
Soils Investigation Report Approved:	**9-Jan-2006**
APAR Approved:	**9-Jan-2006**
CMS or RAP Approved:	**3-Jan-2006**
CMI or RACR Approved:	**30-May-2007**
NFA Issuance Letter:	**30-May-2007**

VI. Recommended Action: **No Further Action**

PRELIMINARY REVIEW UNIT CHECKLIST

Facility:	**Alon USA LP Big Spring Refinery**	City:	**Big Spring, Texas**
ISW Reg. No:	**SWR-30083**	Date:	**March 19, 2024**
Permit No:	**HW-50140**	Reviewer:	**Robert Sherrill, PG**
EPA ID No:	**TXD008013468**	Status:	**NO FURTHER ACTION**

I. Waste Management Unit:

A. NOR No: **na**
Other Identifier: **WP-4B**
Grid Locations: **E790400, N241400**

B. Description: **T02 – Surface Impoundment (0.18 acres)**

C. Dates of Operation **1992**

II. Waste Managed: **Boiler, raw water treatment blowdown prior to WP-2, barium, chromium, lead, toluene**

III, Evidence of Release: **No evidence of release during investigation**

IV. Pollutant Dispersal Pathways: **Potential - Through unsaturated zone to aquifer, south along groundwater gradient to Beal's Creek**

V. Summary:

RFI Investigation Phase:	**Group 3**
GW Investigation Report Approved:	**19-Oct-1993**
Soils Investigation Report Approved:	**9-Jan-2006**
APAR Approved:	**9-Jan-2006**
CMS or RAP Approved:	**3-Jan-2006**
CMI or RACR Approved:	**30-May-2007**
NFA Issuance Letter:	**30-May-2007**

VI. Recommended Action: **No Further Action**

PRELIMINARY REVIEW UNIT CHECKLIST

Facility:	**Alon USA LP Big Spring Refinery**	City:	**Big Spring, Texas**
ISW Reg. No:	**SWR-30083**	Date:	**March 19, 2024**
Permit No:	**HW-50140**	Reviewer:	**Robert Sherrill, PG**
EPA ID No:	**TXD008013468**	Status:	**NO FURTHER ACTION**

I. Waste Management Unit:

A. NOR No: **na**
Other Identifier: **WP-5**
Grid Locations: **E792800, N241150**

B. Description: **T02 – Surface Impoundment (1.1 acres)**

C. Dates of Operation **1966-Present (Active Unit)**

II. Waste Managed: **Surface runoff from SW portion of tank farm prior to WP-6, arsenic, barium, lead, benzene, toluene, cresols, phenol, methyl ethyl ketone**

III, Evidence of Release: **No evidence of release during investigation**

IV. Pollutant Dispersal Pathways: **Potential - Through unsaturated zone to aquifer, south along groundwater gradient to Beal's Creek**

V. Summary:

RFI Investigation Phase:	**Group 3**
GW Investigation Report Approved:	**19-Oct-1993**
Soils Investigation Report Approved:	**9-Jan-2006**
APAR Approved:	**9-Jan-2006**
CMS or RAP Approved:	**3-Jan-2006**
CMI or RACR Approved:	**30-May-2007**
NFA Issuance Letter:	**30-May-2007**

VI. Recommended Action: **No Further Action**

PRELIMINARY REVIEW UNIT CHECKLIST

Facility:	**Alon USA LP Big Spring Refinery**	City:	**Big Spring, Texas**
ISW Reg. No:	**SWR-30083**	Date:	**March 19, 2024**
Permit No:	**HW-50140**	Reviewer:	**Robert Sherrill, PG**
EPA ID No:	**TXD008013468**	Status:	**NO FURTHER ACTION**

I. Waste Management Unit:

A. NOR No: **na**
Other Identifier: **WP-6**
Grid Locations: **E791600, N239000**

B. Description: **T02 – Surface Impoundment (27.3 acres)**

C. Dates of Operation **1976-Present (Active Unit)**

II. Waste Managed: **Treated WW effluent, flow from WP-5, chromium, barium, cadmium, lead, nickel, selenium, antimony, cyanide, phenol, benzidene, toluene**

III, Evidence of Release: **No evidence of release during investigation**

IV. Pollutant Dispersal Pathways: **Potential - Through unsaturated zone to aquifer, south along groundwater gradient to Beal's Creek**

V. Summary:

RFI Investigation Phase:	**Group 3**
GW Investigation Report Approved:	**19-Jan-1995**
Soils Investigation Report Approved:	**12-Apr-2004**
APAR Approved:	**9-Jan-2006**
CMS or RAP Approved:	**3-Jan-2006**
CMI or RACR Approved:	**30-May-2007**
NFA Issuance Letter:	**8-Jul-2005**

VI. Recommended Action: **No Further Action**

PRELIMINARY REVIEW UNIT CHECKLIST

Facility:	**Alon USA LP Big Spring Refinery**	City:	**Big Spring, Texas**
ISW Reg. No:	**SWR-30083**	Date:	**March 19, 2024**
Permit No:	**HW-50140**	Reviewer:	**Robert Sherrill, PG**
EPA ID No:	**TXD008013468**	Status:	**NO FURTHER ACTION**

I. Waste Management Unit:

A. NOR No: **na**
Other Identifier: **WP-7**
Grid Locations: **E791000, N244000**

B. Description: **T02 – Surface Impoundment (13.09 acres)**

C. Dates of Operation **Unknown-1976**

II. Waste Managed:

WP-9A and northside non-oily WW, polystyrene centrifuge water, non-process sewers from reformer units/BTX units/polyisobutylene unit/sulfur unit/ hydeal unit, hydrar unit, ethylbenzene/ethyltoluene unit/ styrene unit/ dripolene unit

III, Evidence of Release: **No evidence of release during investigation**

IV. Pollutant Dispersal Pathways: **Potential - Through unsaturated zone to aquifer, south along groundwater gradient to Beal's Creek**

V. Summary:

RFI Investigation Phase:	**Phase II, Subphase 2**
GW Investigation Report Approved:	**14-Aug-1996**
Soils Investigation Report Approved:	**14-Aug-1996**
APAR Approved:	**na**
CMS or RAP Approved:	**3-Sep-2004**
CMI or RACR Approved:	**8-Jul-2005**
NFA Issuance Letter:	**Jul-26-1995**

VI. Recommended Action: **No Further Action**

PRELIMINARY REVIEW UNIT CHECKLIST

Facility:	**Alon USA LP Big Spring Refinery**	City:	**Big Spring, Texas**
ISW Reg. No:	**SWR-30083**	Date:	**March 19, 2024**
Permit No:	**HW-50140**	Reviewer:	**Robert Sherrill, PG**
EPA ID No:	**TXD008013468**	Status:	**NO FURTHER ACTION**

I. Waste Management Unit:

A. NOR No: **na**
Other Identifier: **WP-7A**
Grid Locations: **E791100, N243400**

B. Description: **T02 – Surface Impoundment (Under Site E)**

C. Dates of Operation **Before 1979**

II. Waste Managed: **Oil overflow from WP-7**

III, Evidence of Release: **No evidence of release during investigation**

IV. Pollutant Dispersal Pathways: **Potential - Through unsaturated zone to aquifer, south along groundwater gradient to Beal's Creek**

V. Summary:

RFI Investigation Phase:	**Located under Site E LTU**
GW Investigation Report Approved:	**19-Jan-1995**
Soils Investigation Report Approved:	**2-Feb-2001**
APAR Approved:	**na**
CMS or RAP Approved:	**na**
CMI or RACR Approved:	**21-Apr-1994**
NFA Issuance Letter:	**2-Feb-2001**

VI. Recommended Action: **No Further Action**

PRELIMINARY REVIEW UNIT CHECKLIST

Facility:	**Alon USA LP Big Spring Refinery**	City:	**Big Spring, Texas**
ISW Reg. No:	**SWR-30083**	Date:	**March 19, 2024**
Permit No:	**HW-50140**	Reviewer:	**Robert Sherrill, PG**
EPA ID No:	**TXD008013468**	Status:	**NO FURTHER ACTION**

I. Waste Management Unit:

A. NOR No: **na**
Other Identifier: **WP-8**
Grid Locations: **E791600, N244100**

B. Description: **T02 – Surface Impoundment (2.47 acres)**

C. Dates of Operation **1976-1980**

II. Waste Managed: **Skimmed oils and solids from WW**

III, Evidence of Release: **No evidence of release during investigation**

IV. Pollutant Dispersal Pathways: **Potential - Through unsaturated zone to aquifer, south along groundwater gradient to Beal's Creek**

V. Summary:

RFI Investigation Phase:	**Phase I, Subphase 3**
GW Investigation Report Approved:	**19-Jan-1995**
Soils Investigation Report Approved:	**2-Feb-2001**
APAR Approved:	**na**
CMS or RAP Approved:	**24-May-2000**
CMI or RACR Approved:	**2-Feb-2001**
NFA Issuance Letter:	**2-Feb-2001**

VI. Recommended Action: **No Further Action**

PRELIMINARY REVIEW UNIT CHECKLIST

Facility:	**Alon USA LP Big Spring Refinery**	City:	**Big Spring, Texas**
ISW Reg. No:	**SWR-30083**	Date:	**March 19, 2024**
Permit No:	**HW-50140**	Reviewer:	**Robert Sherrill, PG**
EPA ID No:	**TXD008013468**	Status:	**NO FURTHER ACTION**

I. Waste Management Unit:

A. NOR No: **na**
Other Identifier: **WP-9**
Grid Locations: **E791500, N243750**

B. Description: **T02 – Surface Impoundment (0.21 acres)**

C. Dates of Operation **Unknown-1974**

II. Waste Managed: **WW from WP-9A**

III, Evidence of Release: **No evidence of release during investigation**

IV. Pollutant Dispersal Pathways: **Potential - Through unsaturated zone to aquifer, south along groundwater gradient to Beal's Creek**

V. Summary:

RFI Investigation Phase:	**Phase I, Subphase 3**
GW Investigation Report Approved:	**19-Jan-1995**
Soils Investigation Report Approved:	**2-Feb-2001**
APAR Approved:	**na**
CMS or RAP Approved:	**24-May-2000**
CMI or RACR Approved:	**2-Feb-2001**
NFA Issuance Letter:	**2-Feb-2001**

VI. Recommended Action: **No Further Action**

PRELIMINARY REVIEW UNIT CHECKLIST

Facility:	**Alon USA LP Big Spring Refinery**	City:	**Big Spring, Texas**
ISW Reg. No:	**SWR-30083**	Date:	**March 19, 2024**
Permit No:	**HW-50140**	Reviewer:	**Robert Sherrill, PG**
EPA ID No:	**TXD008013468**	Status:	**NO FURTHER ACTION**

I. Waste Management Unit:

A. NOR No: **na**
Other Identifier: **WP-9A**
Grid Locations: **E791500, N243600**

B. Description: **T02 – Surface Impoundment (0.07 acres)**

C. Dates of Operation **Unknown-1976**

II. Waste Managed: **WP-1, API separator effluent and north side oily WW (crude units, HDS reformer, HF Alkylation, poly unit, Dubbs unit, FCCU, gasoline treaters, reverse osmosis units, cooling towers, sour water strippers, asphalt blowstills, fuels blending, laboratories, contaminated runoff, boilers, hot line process softeners, zeolite softeners, raw water clarifier, #1 & #2 unifiners**

III, Evidence of Release: **No evidence of release during investigation**

IV. Pollutant Dispersal Pathways: **Potential - Through unsaturated zone to aquifer, south along groundwater gradient to Beal's Creek**

V. Summary: **RFI: Phase I, Subphase 3**
Groundwater Investigation Report Approved – January 19, 1995
Soils Investigation Report Approved – February 25, 1999
APAR Approved – na
CMS or RAP Approved – May 24, 2000
CMI or RACR Approved – February 02, 2001
No Further Action Approval – February 02, 2001 / February 25, 2005

VI. Recommended Action: **No Further Action**

V. Summary:

RFI Investigation Phase:	**Phase I, Subphase 3**
GW Investigation Report Approved:	**19-Jan-1995**
Soils Investigation Report Approved:	**29-Jan-2002**
APAR Approved:	**na**
CMS or RAP Approved:	**24-May-2000**
CMI or RACR Approved:	**2-Feb-2001**
NFA Issuance Letter:	**13-Dec-2005**

VI. Recommended Action: **No Further Action**

PRELIMINARY REVIEW UNIT CHECKLIST

Facility:	**Alon USA LP Big Spring Refinery**	City:	**Big Spring, Texas**
ISW Reg. No:	**SWR-30083**	Date:	**March 19, 2024**
Permit No:	**HW-50140**	Reviewer:	**Robert Sherrill, PG**
EPA ID No:	**TXD008013468**	Status:	**NO FURTHER ACTION**

I. Waste Management Unit:

A. NOR No: **na**
Other Identifier: **WP-11**
Grid Locations: **E788600, N243450**

B. Description: **T02 – Surface Impoundment (0.36 acres)**

C. Dates of Operation **1963-1985**

II. Waste Managed: **Polystyrene, WW, surface runoff, overflow from WP-28, arsenic, barium, cadmium, chromium, lead, nickel, acrylonitrile, benzene, toluene, phenol, styrene**

III, Evidence of Release: **No evidence of release during investigation**

IV. Pollutant Dispersal Pathways: **Potential - Through unsaturated zone to aquifer, south along groundwater gradient to Beal's Creek**

V. Summary:

RFI Investigation Phase:	**Phase I, Subphase 6**
GW Investigation Report Approved:	**19-Jan-1995**
Soils Investigation Report Approved:	**29-Jan-2002**
APAR Approved:	**na**
CMS or RAP Approved:	**26-May-2000**
CMI or RACR Approved:	**29-Jan-2002**
NFA Issuance Letter:	**13-Dec-2005**

VI. Recommended Action: **No Further Action**

PRELIMINARY REVIEW UNIT CHECKLIST

Facility:	**Alon USA LP Big Spring Refinery**	City:	**Big Spring, Texas**
ISW Reg. No:	**SWR-30083**	Date:	**March 19, 2024**
Permit No:	**HW-50140**	Reviewer:	**Robert Sherrill, PG**
EPA ID No:	**TXD008013468**	Status:	**NO FURTHER ACTION**

I. Waste Management Unit:

A. NOR No: **na**
Other Identifier: **WP-12**
Grid Locations: **E788250, N243700**

B. Description: **T02 – Surface Impoundment (0.62 acres)**

C. Dates of Operation **1985**

II. Waste Managed: **Surface runoff and overflow from WP-11, chromium, acrylonitrile, phenol, styrene**

III, Evidence of Release: **No evidence of release during investigation**

IV. Pollutant Dispersal Pathways: **Potential - Through unsaturated zone to aquifer, south along groundwater gradient to Beal's Creek**

V. Summary:

RFI Investigation Phase:	**Phase I, Subphase 6**
GW Investigation Report Approved:	**19-Jan-1995**
Soils Investigation Report Approved:	**12-Apr-2004**
APAR Approved:	**na**
CMS or RAP Approved:	**26-May-2000**
CMI or RACR Approved:	**29-Jan-2002**
NFA Issuance Letter:	**8-Jul-2005**

VI. Recommended Action: **No Further Action**

PRELIMINARY REVIEW UNIT CHECKLIST

Facility:	**Alon USA LP Big Spring Refinery**	City:	**Big Spring, Texas**
ISW Reg. No:	**SWR-30083**	Date:	**March 19, 2024**
Permit No:	**HW-50140**	Reviewer:	**Robert Sherrill, PG**
EPA ID No:	**TXD008013468**	Status:	**NO FURTHER ACTION**

I. Waste Management Unit:

A. NOR No: **na**
Other Identifier: **WP-13**
Grid Locations: **E788900, N245500**

B. Description: **T02 – Surface Impoundment (6.17 acres)**

C. Dates of Operation **1976**

II. Waste Managed: **WW from WP-22, chromium, phenol, arsenic, lead, nickel, acetone, benzene, toluene, ethylbenzene, xylenes, 2,4-dimethylphenol, cresols**

III, Evidence of Release: **No evidence of release during investigation**

IV. Pollutant Dispersal Pathways: **Potential - Through unsaturated zone to aquifer, south along groundwater gradient to Beal's Creek**

V. Summary:

RFI Investigation Phase:	**Phase II, Subphase 1**
GW Investigation Report Approved:	**19-Jan-1995**
Soils Investigation Report Approved:	**12-Apr-2004**
APAR Approved:	**na**
CMS or RAP Approved:	**3-Sep-2004**
CMI or RACR Approved:	**8-Jul-2005**
NFA Issuance Letter:	**8-Jul-2005**

VI. Recommended Action: **No Further Action**

PRELIMINARY REVIEW UNIT CHECKLIST

Facility:	**Alon USA LP Big Spring Refinery**	City:	**Big Spring, Texas**
ISW Reg. No:	**SWR-30083**	Date:	**March 19, 2024**
Permit No:	**HW-50140**	Reviewer:	**Robert Sherrill, PG**
EPA ID No:	**TXD008013468**	Status:	**NO FURTHER ACTION**

I. Waste Management Unit:

A. NOR No: **na**
Other Identifier: **WP-14**
Grid Locations: **E787900, N245800**

B. Description: **T02 – Surface Impoundment (20.2 acres)**

C. Dates of Operation **1976**

II. Waste Managed: **WW from WP-13, chromium, phenol, arsenic, lead, nickel, acetone, BTEX, 2,4-dimethyphenol, cresols**

III, Evidence of Release: **No evidence of release during investigation**

IV. Pollutant Dispersal Pathways: **Potential - Through unsaturated zone to aquifer, south along groundwater gradient to Beal's Creek**

V. Summary:

RFI Investigation Phase:	**Phase II, Subphase 1**
GW Investigation Report Approved:	**19-Jan-1995**
Soils Investigation Report Approved:	**12-Apr-2004**
APAR Approved:	**na**
CMS or RAP Approved:	**3-Sep-2004**
CMI or RACR Approved:	**8-Jul-2005**
NFA Issuance Letter:	**23-Jul-2003**

VI. Recommended Action: **No Further Action**

PRELIMINARY REVIEW UNIT CHECKLIST

Facility:	**Alon USA LP Big Spring Refinery**	City:	**Big Spring, Texas**
ISW Reg. No:	**SWR-30083**	Date:	**March 19, 2024**
Permit No:	**HW-50140**	Reviewer:	**Robert Sherrill, PG**
EPA ID No:	**TXD008013468**	Status:	**NO FURTHER ACTION**

I. Waste Management Unit:

A. NOR No: **na**
Other Identifier: **WP-15**
Grid Locations: **E789300, N244300**

B. Description: **T02 – Surface Impoundment (5.89 acres)**

C. Dates of Operation **Unknown-1976**

II. Waste Managed: **Wet-wether flow from PID unit**

III, Evidence of Release: **No evidence of release during investigation**

IV. Pollutant Dispersal Pathways: **Potential - Through unsaturated zone to aquifer, south along groundwater gradient to Beal's Creek**

V. Summary: **RFI: Phase II, Subphase 3**
Groundwater Investigation Report Approved – January 19, 1995
Soils Investigation Report Approved – July 23, 2003
APAR Approved – na
CMS or RAP Approved – na
CMI or RACR Approved – na
No Further Action Approval – July 23, 2003 / February 25, 2005

VI. Recommended Action: **No Further Action**

V. Summary:

RFI Investigation Phase:	**Phase II, Subphase 3**
GW Investigation Report Approved:	**19-Jan-1995**
Soils Investigation Report Approved:	**2-Feb-2001**
APAR Approved:	**na**
CMS or RAP Approved:	**na**
CMI or RACR Approved:	**na**
NFA Issuance Letter:	**2-Feb-2001**

VI. Recommended Action: **No Further Action**

PRELIMINARY REVIEW UNIT CHECKLIST

Facility:	**Alon USA LP Big Spring Refinery**	City:	**Big Spring, Texas**
ISW Reg. No:	**SWR-30083**	Date:	**March 19, 2024**
Permit No:	**HW-50140**	Reviewer:	**Robert Sherrill, PG**
EPA ID No:	**TXD008013468**	Status:	**NO FURTHER ACTION**

I. Waste Management Unit:

A. NOR No: **na**
Other Identifier: **WP-16**
Grid Locations: **E791700, N243400**

B. Description: **T02 – Surface Impoundment (1.81 acres)**

C. Dates of Operation **Unknown-1976**

II. Waste Managed: **Wet-wether flow from WP-9**

III, Evidence of Release: **No evidence of release during investigation**

IV. Pollutant Dispersal Pathways: **Potential - Through unsaturated zone to aquifer, south along groundwater gradient to Beal's Creek**

V. Summary:

RFI Investigation Phase:	**Phase I, Subphase 3**
GW Investigation Report Approved:	**19-Jan-1995**
Soils Investigation Report Approved:	**2-Feb-2001**
APAR Approved:	**na**
CMS or RAP Approved:	**24-May-2000**
CMI or RACR Approved:	**2-Feb-2001**
NFA Issuance Letter:	**2-Feb-2001**

VI. Recommended Action: **No Further Action**

PRELIMINARY REVIEW UNIT CHECKLIST

Facility:	**Alon USA LP Big Spring Refinery**	City:	**Big Spring, Texas**
ISW Reg. No:	**SWR-30083**	Date:	**March 19, 2024**
Permit No:	**HW-50140**	Reviewer:	**Robert Sherrill, PG**
EPA ID No:	**TXD008013468**	Status:	**NO FURTHER ACTION**

I. Waste Management Unit:

A. NOR No: **na**
Other Identifier: **WP-17**
Grid Locations: **E792100, N243500**

B. Description: **T02 – Surface Impoundment (1.14 acres)**

C. Dates of Operation **1966-1976**

II. Waste Managed: **WW overflow from WP-16, arsenic, chromium, lead, nickel, benzene, toluene, xylenes, acetone, 2,4-dimethyphenol, cresols**

III, Evidence of Release: **No evidence of release during investigation**

IV. Pollutant Dispersal Pathways: **Potential - Through unsaturated zone to aquifer, south along groundwater gradient to Beal's Creek**

V. Summary:

RFI Investigation Phase:	**Phase I, Subphase 1**
GW Investigation Report Approved:	**19-Jan-1995**
Soils Investigation Report Approved:	**2-Feb-2001**
APAR Approved:	**na**
CMS or RAP Approved:	**22-Mar-2002**
CMI or RACR Approved:	**2-Feb-2001**
NFA Issuance Letter:	**2-Feb-2001**

VI. Recommended Action: **No Further Action**

PRELIMINARY REVIEW UNIT CHECKLIST

Facility:	**Alon USA LP Big Spring Refinery**	City:	**Big Spring, Texas**
ISW Reg. No:	**SWR-30083**	Date:	**March 19, 2024**
Permit No:	**HW-50140**	Reviewer:	**Robert Sherrill, PG**
EPA ID No:	**TXD008013468**	Status:	**NO FURTHER ACTION**

I. Waste Management Unit:

A. NOR No: **na**
Other Identifier: **WP-18**
Grid Locations: **E792400, N243600**

B. Description: **T02 – Surface Impoundment (2.73 acres)**

C. Dates of Operation **Unknown-1980**

II. Waste Managed: **WW overflow from WP-17, arsenic, chromium, lead, nickel, benzene, toluene, xylenes, acetone, 2,4-dimethylphenol, cresols**

III, Evidence of Release: **No evidence of release during investigation**

IV. Pollutant Dispersal Pathways: **Potential - Through unsaturated zone to aquifer, south along groundwater gradient to Beal's Creek**

V. Summary:

RFI: Phase I, Subphase 1
Groundwater Investigation Report Approved – January 19, 1995
Soils Investigation Report Approved – January 11, 1999
APAR Approved – na
CMS or RAP Approved – March 22, 2002
CMI or RACR Approved – February 02, 2001
No Further Action Approval – February 25, 2005

VI. Recommended Action: **No Further Action**

V. Summary:

RFI Investigation Phase:	**Phase I, Subphase 1**
GW Investigation Report Approved:	**19-Jan-1995**
Soils Investigation Report Approved:	**2-Feb-2001**
APAR Approved:	**na**
CMS or RAP Approved:	**22-Mar-2002**
CMI or RACR Approved:	**2-Feb-2001**
NFA Issuance Letter:	**2-Feb-2001**

VI. Recommended Action: **No Further Action**

PRELIMINARY REVIEW UNIT CHECKLIST

Facility:	**Alon USA LP Big Spring Refinery**	City:	**Big Spring, Texas**
ISW Reg. No:	**SWR-30083**	Date:	**March 19, 2024**
Permit No:	**HW-50140**	Reviewer:	**Robert Sherrill, PG**
EPA ID No:	**TXD008013468**	Status:	**NO FURTHER ACTION**

I. Waste Management Unit:

A. NOR No: **na**
Other Identifier: **WP-19**
Grid Locations: **E792700, N243800**

B. Description: **T02 – Surface Impoundment (7.46 acres)**

C. Dates of Operation **1976**

II. Waste Managed: **WW overflow from WP-18, arsenic, chromium, lead, nickel, benzene, toluene, xylenes, acetone, 2,4-dimethylphenol, cresols**

III, Evidence of Release: **No evidence of release during investigation**

IV. Pollutant Dispersal Pathways: **Potential - Through unsaturated zone to aquifer, south along groundwater gradient to Beal's Creek**

V. Summary:

RFI Investigation Phase:	**Phase I, Subphase 1**
GW Investigation Report Approved:	**19-Jan-1995**
Soils Investigation Report Approved:	**2-Feb-2001**
APAR Approved:	**na**
CMS or RAP Approved:	**22-Mar-2002**
CMI or RACR Approved:	**2-Feb-2001**
NFA Issuance Letter:	**2-Feb-2001**

VI. Recommended Action: **No Further Action**

PRELIMINARY REVIEW UNIT CHECKLIST

Facility:	**Alon USA LP Big Spring Refinery**	City:	**Big Spring, Texas**
ISW Reg. No:	**SWR-30083**	Date:	**March 19, 2024**
Permit No:	**HW-50140**	Reviewer:	**Robert Sherrill, PG**
EPA ID No:	**TXD008013468**	Status:	**NO FURTHER ACTION**

I. Waste Management Unit:

A. NOR No: **na**
Other Identifier: **WP-20**
Grid Locations: **E793000, N243500**

B. Description: **T02 – Surface Impoundment (2.27 acres)**

C. Dates of Operation **1966-1976**

II. Waste Managed: **WW overflow from WP-19, arsenic, chromium, lead, nickel, benzene, toluene, xylenes, acetone, 2,4-dimethylphenol, cresols**

III, Evidence of Release: **No evidence of release during investigation**

IV. Pollutant Dispersal Pathways: **Potential - Through unsaturated zone to aquifer, south along groundwater gradient to Beal's Creek**

V. Summary:

RFI Investigation Phase:	**Phase I, Subphase 1**
GW Investigation Report Approved:	**19-Jan-1995**
Soils Investigation Report Approved:	**12-Apr-2004**
APAR Approved:	**na**
CMS or RAP Approved:	**22-Mar-2002**
CMI or RACR Approved:	**2-Feb-2001**
NFA Issuance Letter:	**8-Jul-2005**

VI. Recommended Action: **No Further Action**

PRELIMINARY REVIEW UNIT CHECKLIST

Facility:	**Alon USA LP Big Spring Refinery**	City:	**Big Spring, Texas**
ISW Reg. No:	**SWR-30083**	Date:	**March 19, 2024**
Permit No:	**HW-50140**	Reviewer:	**Robert Sherrill, PG**
EPA ID No:	**TXD008013468**	Status:	**NO FURTHER ACTION**

I. Waste Management Unit:

A. NOR No: **na**
Other Identifier: **WP-21**
Grid Locations: **E790500, N244900**

B. Description: **T02 – Surface Impoundment (4.31 acres)**

C. Dates of Operation **Unknown-1976**

II. Waste Managed: **Overflow from WP-7**

III, Evidence of Release: **No evidence of release during investigation**

IV. Pollutant Dispersal Pathways: **Potential - Through unsaturated zone to aquifer, south along groundwater gradient to Beal's Creek**

V. Summary:

RFI Investigation Phase:	**Phase II, Subphase 2**
GW Investigation Report Approved:	**19-Jan-1995**
Soils Investigation Report Approved:	**12-Apr-2004**
APAR Approved:	**na**
CMS or RAP Approved:	**3-Sep-2004**
CMI or RACR Approved:	**8-Jul-2005**
NFA Issuance Letter:	**23-Jul-2003**

VI. Recommended Action: **No Further Action**

PRELIMINARY REVIEW UNIT CHECKLIST

Facility:	**Alon USA LP Big Spring Refinery**	City:	**Big Spring, Texas**
ISW Reg. No:	**SWR-30083**	Date:	**March 19, 2024**
Permit No:	**HW-50140**	Reviewer:	**Robert Sherrill, PG**
EPA ID No:	**TXD008013468**	Status:	**NO FURTHER ACTION**

I. Waste Management Unit:

A. NOR No: **na**
Other Identifier: **WP-22**
Grid Locations: **E789600, N245000**

B. Description: **T02 – Surface Impoundment (1.46 acres)**

C. Dates of Operation **Unknown-1976**

II. Waste Managed: **Overflow from WP-21**

III, Evidence of Release: **No evidence of release during investigation**

IV. Pollutant Dispersal Pathways: **Potential - Through unsaturated zone to aquifer, south along groundwater gradient to Beal's Creek**

V. Summary:

RFI Investigation Phase:	**Phase II, Subphase 3**
GW Investigation Report Approved:	**19-Jan-1995**
Soils Investigation Report Approved:	**29-Jan-2002**
APAR Approved:	**na**
CMS or RAP Approved:	**na**
CMI or RACR Approved:	**na**
NFA Issuance Letter:	**29-Jan-2002**

VI. Recommended Action: **No Further Action**

PRELIMINARY REVIEW UNIT CHECKLIST

Facility:	**Alon USA LP Big Spring Refinery**	City:	**Big Spring, Texas**
ISW Reg. No:	**SWR-30083**	Date:	**March 19, 2024**
Permit No:	**HW-50140**	Reviewer:	**Robert Sherrill, PG**
EPA ID No:	**TXD008013468**	Status:	**NO FURTHER ACTION**

I. Waste Management Unit:

A. NOR No: **na**
Other Identifier: **WP-23**
Grid Locations: **E788200, N244800**

B. Description: **T02 – Surface Impoundment (0.13 acres)**

C. Dates of Operation **Unknown**

II. Waste Managed: **Ammonia plant WW, chromium, phenol**

III, Evidence of Release: **No evidence of release during investigation**

IV. Pollutant Dispersal Pathways: **Potential - Through unsaturated zone to aquifer, south along groundwater gradient to Beal's Creek**

V. Summary:

RFI Investigation Phase:	**Phase I, Subphase 5**
GW Investigation Report Approved:	**19-Jan-1995**
Soils Investigation Report Approved:	**29-Jan-2002**
APAR Approved:	**na**
CMS or RAP Approved:	**26-May-2000**
CMI or RACR Approved:	**29-Jan-2002**
NFA Issuance Letter:	**29-Jan-2002**

VI. Recommended Action: **No Further Action**

PRELIMINARY REVIEW UNIT CHECKLIST

Facility:	**Alon USA LP Big Spring Refinery**	City:	**Big Spring, Texas**
ISW Reg. No:	**SWR-30083**	Date:	**March 19, 2024**
Permit No:	**HW-50140**	Reviewer:	**Robert Sherrill, PG**
EPA ID No:	**TXD008013468**	Status:	**NO FURTHER ACTION**

I. Waste Management Unit:

A. NOR No: **na**
Other Identifier: **WP-24**
Grid Locations: **E788150, N244700**

B. Description: **T02 – Surface Impoundment (0.23 acres)**

C. Dates of Operation **Unknown**

II. Waste Managed: **Northside process WW and polystyrene WW, chromium, phenol, styrene**

III, Evidence of Release: **No evidence of release during investigation**

IV. Pollutant Dispersal Pathways: **Potential - Through unsaturated zone to aquifer, south along groundwater gradient to Beal's Creek**

V. Summary:

RFI Investigation Phase:	**Phase I, Subphase 5**
GW Investigation Report Approved:	**19-Jan-1995**
Soils Investigation Report Approved:	**29-Jan-2002**
APAR Approved:	**na**
CMS or RAP Approved:	**26-May-2000**
CMI or RACR Approved:	**29-Jan-2002**
NFA Issuance Letter:	**29-Jan-2002**

VI. Recommended Action: **No Further Action**

PRELIMINARY REVIEW UNIT CHECKLIST

Facility:	**Alon USA LP Big Spring Refinery**	City:	**Big Spring, Texas**
ISW Reg. No:	**SWR-30083**	Date:	**March 19, 2024**
Permit No:	**HW-50140**	Reviewer:	**Robert Sherrill, PG**
EPA ID No:	**TXD008013468**	Status:	**NO FURTHER ACTION**

I. Waste Management Unit:

A. NOR No: **na**
Other Identifier: **WP-25**
Grid Locations: **E788100, N244750**

B. Description: **T02 – Surface Impoundment (0.09 acres)**

C. Dates of Operation **Unknown**

II. Waste Managed: **Polystyrene WW, chromium, phenol, styrene**

III, Evidence of Release: **No evidence of release during investigation**

IV. Pollutant Dispersal Pathways: **Potential - Through unsaturated zone to aquifer, south along groundwater gradient to Beal's Creek**

V. Summary:

RFI Investigation Phase:	**Phase I, Subphase 5**
GW Investigation Report Approved:	**19-Jan-1995**
Soils Investigation Report Approved:	**29-Jan-2002**
APAR Approved:	**na**
CMS or RAP Approved:	**26-May-2000**
CMI or RACR Approved:	**29-Jan-2002**
NFA Issuance Letter:	**29-Jan-2002**

VI. Recommended Action: **No Further Action**

PRELIMINARY REVIEW UNIT CHECKLIST

Facility:	**Alon USA LP Big Spring Refinery**	City:	**Big Spring, Texas**
ISW Reg. No:	**SWR-30083**	Date:	**March 19, 2024**
Permit No:	**HW-50140**	Reviewer:	**Robert Sherrill, PG**
EPA ID No:	**TXD008013468**	Status:	**NO FURTHER ACTION**

I. Waste Management Unit:

A. NOR No: **na**
Other Identifier: **WP-26**
Grid Locations: **E788050, N244850**

B. Description: **T02 – Surface Impoundment (0.06 acres)**

C. Dates of Operation **Unknown**

II. Waste Managed: **Overflow from WP-25, chromium, phenol, styrene**

III, Evidence of Release: **No evidence of release during investigation**

IV. Pollutant Dispersal Pathways: **Potential - Through unsaturated zone to aquifer, south along groundwater gradient to Beal's Creek**

V. Summary:

RFI Investigation Phase:	**Phase I, Subphase 5**
GW Investigation Report Approved:	**19-Jan-1995**
Soils Investigation Report Approved:	**29-Jan-2002**
APAR Approved:	**na**
CMS or RAP Approved:	**26-May-2000**
CMI or RACR Approved:	**29-Jan-2002**
NFA Issuance Letter:	**29-Jan-2002**

VI. Recommended Action: **No Further Action**

PRELIMINARY REVIEW UNIT CHECKLIST

Facility:	**Alon USA LP Big Spring Refinery**	City:	**Big Spring, Texas**
ISW Reg. No:	**SWR-30083**	Date:	**March 19, 2024**
Permit No:	**HW-50140**	Reviewer:	**Robert Sherrill, PG**
EPA ID No:	**TXD008013468**	Status:	**NO FURTHER ACTION**

I. Waste Management Unit:

A. NOR No: **na**
Other Identifier: **WP-27**
Grid Locations: **E788400, N243800**

B. Description: **T02 – Surface Impoundment (0.27 acres)**

C. Dates of Operation **Unknown**

II. Waste Managed: **Polystyrene WW, chromium, phenol, styrene**

III, Evidence of Release: **No evidence of release during investigation**

IV. Pollutant Dispersal Pathways: **Potential - Through unsaturated zone to aquifer, south along groundwater gradient to Beal's Creek**

V. Summary:

RFI Investigation Phase:	**Phase I, Subphase 6**
GW Investigation Report Approved:	**19-Jan-1995**
Soils Investigation Report Approved:	**29-Jan-2002**
APAR Approved:	**na**
CMS or RAP Approved:	**26-May-2000**
CMI or RACR Approved:	**29-Jan-2002**
NFA Issuance Letter:	**13-Dec-2005**

VI. Recommended Action: **No Further Action**

PRELIMINARY REVIEW UNIT CHECKLIST

Facility:	**Alon USA LP Big Spring Refinery**	City:	**Big Spring, Texas**
ISW Reg. No:	**SWR-30083**	Date:	**March 19, 2024**
Permit No:	**HW-50140**	Reviewer:	**Robert Sherrill, PG**
EPA ID No:	**TXD008013468**	Status:	**NO FURTHER ACTION**

I. Waste Management Unit:

A. NOR No: **na**
Other Identifier: **WP-28**
Grid Locations: **E788400, N243400**

B. Description: **T02 – Surface Impoundment (0.66 acres)**

C. Dates of Operation **Unknown**

II. Waste Managed: **Boiler blowdown**

III, Evidence of Release: **No evidence of release during investigation**

IV. Pollutant Dispersal Pathways: **Potential - Through unsaturated zone to aquifer, south along groundwater gradient to Beal's Creek**

V. Summary:

RFI Investigation Phase:	**Phase I, Subphase 6**
GW Investigation Report Approved:	**14-Aug-1996**
Soils Investigation Report Approved:	**14-Aug-1996**
APAR Approved:	**na**
CMS or RAP Approved:	**26-May-2000**
CMI or RACR Approved:	**29-Jan-2002**
NFA Issuance Letter:	**Jul-26-1995**

VI. Recommended Action: **No Further Action**

PRELIMINARY REVIEW UNIT CHECKLIST

Facility:	**Alon USA LP Big Spring Refinery**	City:	**Big Spring, Texas**
ISW Reg. No:	**SWR-30083**	Date:	**March 19, 2024**
Permit No:	**HW-50140**	Reviewer:	**Robert Sherrill, PG**
EPA ID No:	**TXD008013468**	Status:	**NO FURTHER ACTION**

I. Waste Management Unit:

A. NOR No: **na**
Other Identifier: **WP-29**
Grid Locations: **E791200, N243200**

B. Description: **T02 – Surface Impoundment (Under Site E)**

C. Dates of Operation **Unknown**

II. Waste Managed: **Oil overflow from WP-7A**

III, Evidence of Release: **No evidence of release during investigation**

IV. Pollutant Dispersal Pathways: **Potential - Through unsaturated zone to aquifer, south along groundwater gradient to Beal's Creek**

V. Summary:

RFI Investigation Phase:	**Located Under Site E LTU**
GW Investigation Report Approved:	**na**
Soils Investigation Report Approved:	**4-Dec-2006**
APAR Approved:	**na**
CMS or RAP Approved:	**na**
CMI or RACR Approved:	**21-Apr-1994**
NFA Issuance Letter:	**15-Sep-2010**

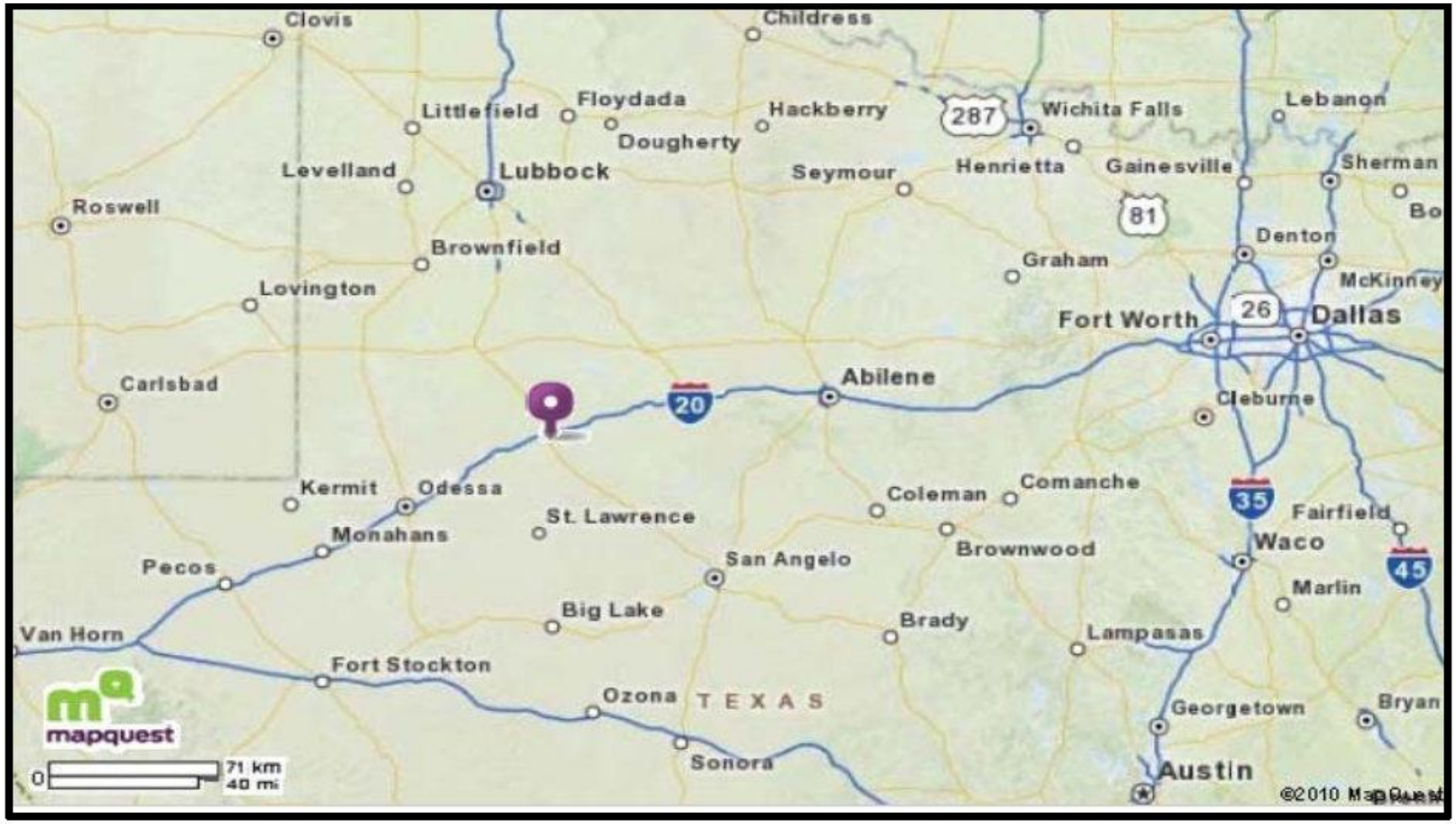
VI. Recommended Action: **No Further Action**

Alon USA, LP
Alon USA Big Spring Refinery
Big Spring, TX

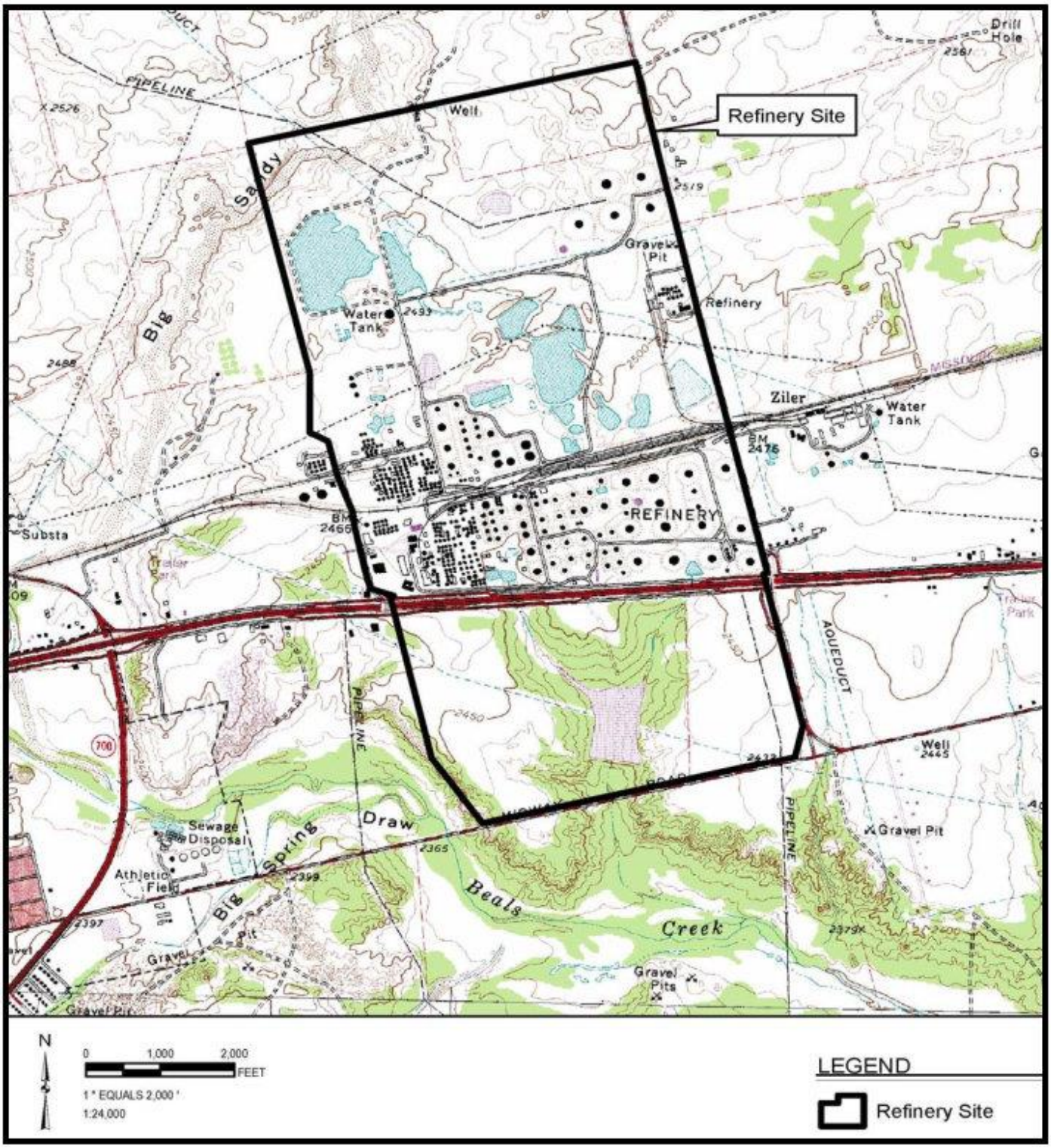
Hazardous Waste Permit 50140 - Part B Application
SWR No. 30083 / RN100250869 / CN600881783

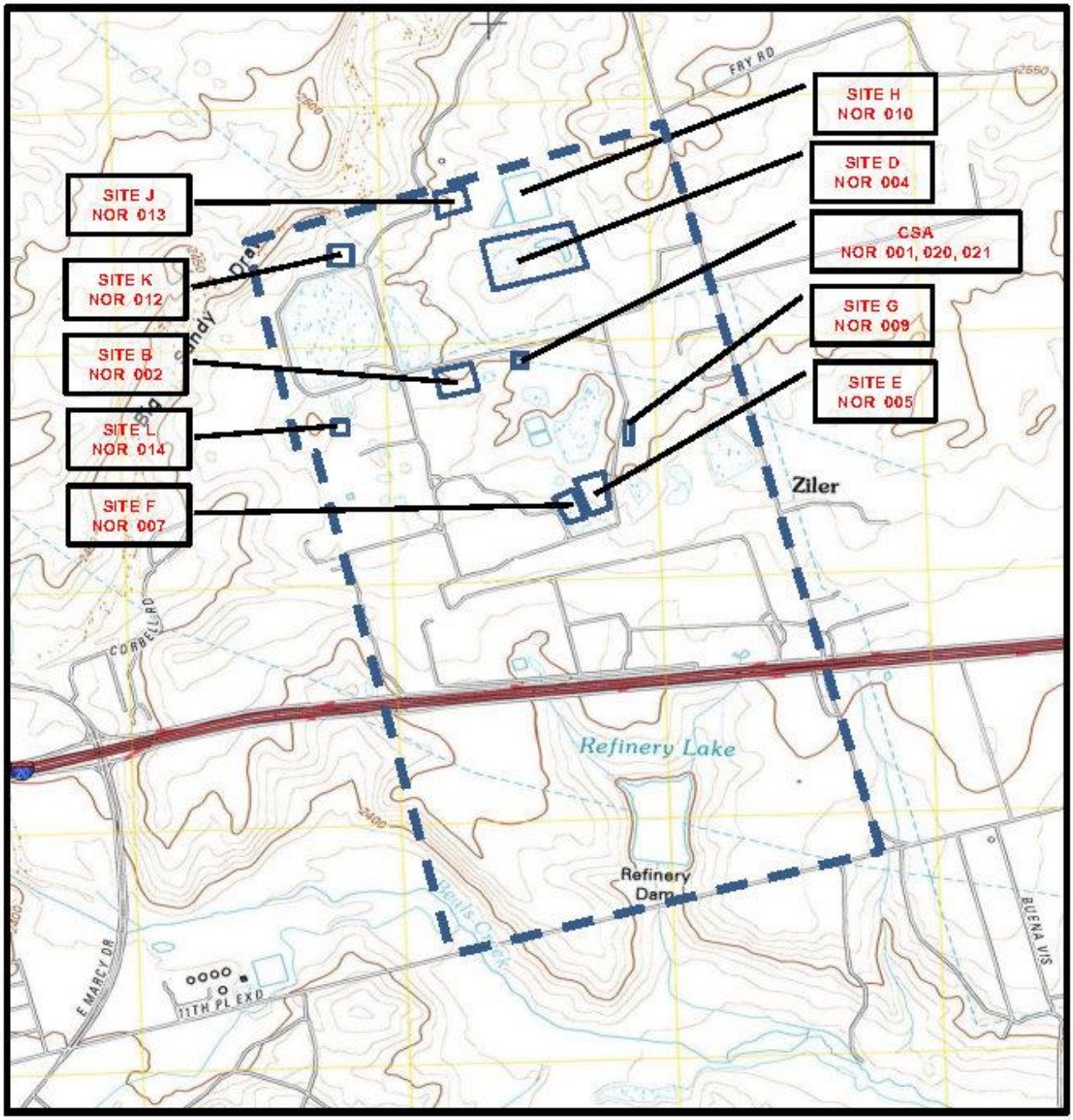
SECTION IX
FACILITY AND SOLID WASTE MANAGEMENT UNITS LOCATION MAPS

Attachment IX, Appendix I, Figure 1 Regional Location Map



Attachment IX, Appendix I, Figure 2 Site Location Map




SITE H
NOR 010
SITE D
NOR 004
CSA
NOR 001, 020, 021
SITE G
NOR 009
SITE E
NOR 005
SITE J
NOR 013
SITE K
NOR 012
SITE B
NOR 002
SITE L
NOR 014
SITE F
NOR 007
FRY RD
Ziler
CORBELLAO
Refinery Lake
Refinery
Dam
Beals Creek
E MARCY DR
11TH PL EXD
BUENA VIS
SCALE 1:24 000
KILOMETERS
METERS
MILES
FEET
CONTOUR INTERVAL 10 FEET
This map was produced to conform with version 0.5.10 of the
draft USGS Standards for 7.5-Minute Quadrangle Maps.
A metadata file associated with this product is also draft version 0.5.10

Alon USA, LP
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Hazardous Waste Permit 50140 - Part B
Application SWR No. 30083 / RN100250869 / CN600881783

SECTION IX
APPENDIX II
WASTES MANAGED

APPENDIX II [IX.B.]

Hazardous Wastes and Management Activities

Alon USA LP - Big Spring Refinery

Verbal Description of Waste	TX Form Code	EPA Form Code	Source Code	TCEQ Waste Code & Waste Class	EPA Hazardous Waste Code	Waste Management Activities				Annual Quantity Generated and/or Received[3] (tons)	SIC Code and Process
						Off-Site	On-Site by Unit NOR ID				
						Disposal	Storage[(1)]	Processing[(2)]	Disposal		
Chromium-Contaminated Soil	302	W301	G32	0006302H	D007	X	213			0.00	2911 Petroleum Refining
Spent Filters with benzene	310	W310	G16	0008310H	D018	X	213, 214, 216			0.00	2911 Petroleum Refining
Heat Exchanger Bundle Cleaning Sludge	695	W609	G13	0010695H	K050	X	213, 214			65.71	2911 Petroleum Refining
Spent Caustic Solution in Water	110	W110	G08	0014110H	D002		213		WWTP 015	0.00	2911 Petroleum Refining
Filter Media from Aromex Unit	489	W319	G07	0018489H	D018		213, 214, 216			0.00	2911 Petroleum Refining
Computer Monitors, Keyboards, Circuit Boards, Circuit board casings & Containers that came in contact with battery	309	W309	G16	0019309H	D007, D008, D009	X				0.00	2911 Petroleum Refining
Tank Bottom cleanout scale & solids	489	W319	G14	0023489H	D001, K169	X	016, 213, 010, 017			10.90	2911 Petroleum Refining
Slop oil emulsion sludge from separation of recoverable oil	603	W603	G09	0027603H	K049		213		WWTP 015	0.00	2911 Petroleum Refining
Concentrated aqueous solution of off-spec Mercaptan & other organic liquids offspec or needing disposal	207	W219	G11	0043207H	D001	X				0.00	2911 Petroleum Refining
Merox Unit Disulfide Seperator material	489	W319	G07	0060489H	D018		213			0.00	2911 Petroleum Refining
Petroleum contaminated Solids	289	W289	G32	0074289H	D018	X				26.02	2911 Petroleum Refining
Primary oil/water/solids separation sludge (dewatered)	319	W319	G25	0075319H	F037		213		WWTP 015	197.17	2911 Petroleum Refining
Spent carbon	404	W310	G49	0100404H	D018	X	213,216			0.00	2911 Petroleum Refining
Gasoline Filters, material containing benzene	310	W219	G07	0110310H	D001, D018	X	213,216			0.61	2911 Petroleum Refining
Crude oil tank bottoms	489	W319	G14	0113489H	D018, K169	X	213			0.00	2911 Petroleum Refining

APPENDIX II [IX.B.]

Hazardous Wastes and Management Activities

Alon USA LP - Big Spring Refinery

Verbal Description of Waste	TX Form Code	EPA Form Code	Source Code	TCEQ Waste Code & Waste Class	EPA Hazardous Waste Code	Waste Management Activities				Annual Quantity Generated and/or Received[3] (tons)	SIC Code and Process
						Off-Site	On-Site by Unit NOR ID				
						Disposal	Storage[1]	Processing[2]	Disposal		
Clarified slurry oil tank sediment	489	W319	G14	0114489H	K170		213			0.00	2911 Petroleum Refining
Tetraethylene Glycol solvent containing benzene and toluene	489	W219	G13	0116489H	D001, D018		001			0.00	2911 Petroleum Refining
Tank Bottom Sludge from Tank Cleanouts	695	W609	G14	0123695H	D018	X	213			112.45	2911 Petroleum Refining
Waste paint and paint related material (ignitable)	209	W209	G11	0129209H	DOO1, D035, F005	X	213			0.00	2911 Petroleum Refining
Spent Catalyst Co/Ni/Mo on Alumina	393	W319	G08	0135393H	D001, D003, D004	X	213			0.00	2911 Petroleum Refining
Spent Hydrotreating Catalyst	393	W319	G08	0138393H	K171	X	213, 215, 216			191.66	2911 Petroleum Refining
Primary/Secondary oil/water/solid separator wastewater sludge	319	W319	G23	0140319H	F037, F038	X				0.00	2911 Petroleum Refining
Non-Acute Hazardous Chemical Lab Waste	003	W001	G11	0144003H	D001, D002, D003, D006, D007, D008, D009, D011, F003, F005	X	213			0.17	2911 Petroleum Refining
Petroleum contaminated soils exhibiting the characteristics of ignitability	489	W301	G13	0155489H	D001		001, 214, 216			0.00	2911 Petroleum Refining
Chromium contaminated metal scale, filings, scrap, or blast material	307	W307	G13	0171307H	D007	X	001, 213			0.00	2911 Petroleum Refining
DGA filter, material containing benzene	489	W219	G07	0200489H	D018	X	213, 214, 216			7.04	2911 Petroleum Refining
SCOTT Quench Filters	489	W219	G07	0300489H	D018	X	213, 214, 216			3.32	2911 Petroleum Refining
DHT filters with high concentration of H2S	801	W310	G13	0500801H	U135	X	214, 216			0.00	2911 Petroleum Refining
Waste resulting from neutralization activites in the Alky Unit	110	W110	G32	0501110H	D002	X	216			0.00	2911 Petroleum Refining

APPENDIX II [IX.B.]

Hazardous Wastes and Management Activities

Alon USA LP - Big Spring Refinery

Verbal Description of Waste	TX Form Code	EPA Form Code	Source Code	TCEQ Waste Code & Waste Class	EPA Hazardous Waste Code	Waste Management Activities				Annual Quantity Generated and/or Received[3] (tons)	SIC Code and Process
						Off-Site	On-Site by Unit NOR ID				
						Disposal	Storage[(1)]	Processing[(2)]	Disposal		
Dry/Slurry metal hydroxide such as KOH that is off-spec or from an onsite process or service activity	305	W316	G11	0568305H	D002		016, 213, 214, 216			17.24	2911 Petroleum Refining

(1) "Storage" means the holding of solid waste for a temporary period, at the end of which the waste is processed, disposed of, or stored elsewhere.

(2) "Processing" means the extraction of materials, transfer, volume reduction, conversion to energy, or other separation and preparation of solid waste for reuse or disposal, including the treatment or neutralization of hazardous waste, designed to change the physical, chemical, or biological character or composition of any hazardous waste so as to neutralize such waste, or so as to recover energy or material from the waste or so as to render such waste nonhazardous or less hazardous; safer for transport, store or dispose of; or amenable for recovery, amenable for storage, or reduced in volume. The "transfer" of solid waste for reuse or disposal as used above, does not include the actions of a transporter in conveying or transporting solid waste by truck, ship, pipeline, or other means. Unless the Executive Director determines that regulation of such activity is necessary to protect human health or the environment, the definition of "processing" does not include activities relating to those materials exempted by the Resource Conservation and Recovery Act, 42 U.s.c. 6901 et seq., as amended .

(3) Represents quantity generated and/ or received during 2009

Waste Unit NOR I.D.:			
	001	Container Storage Area	Drum Storage Area A
	010	Land Treatment Unit	Site H Land Treatment Unit (in Post-Closure Care)
	015	WWTP	Wastewater Treatment Plant
	016	Container Storage Area	Roll-Off Bin Storage Area
	017	Tank	Interim GW Treatment
	213	Container Storage Area	90-Day Storage Area to go Offsite
	214	Container Storage Area	90-Day Storage Area to go Offsite
	215	Container Storage Area	90-Day Storage Area to go Offsite
	216	Container Storage Area	90-Day Storage Area to go Offsite

Alon USA, LP
Alon USA Big Spring Refinery
Big Spring, TX

Hazardous Waste Permit 50140 - Part B
Application SWR No. 30083 / RN100250869 / CN600881783

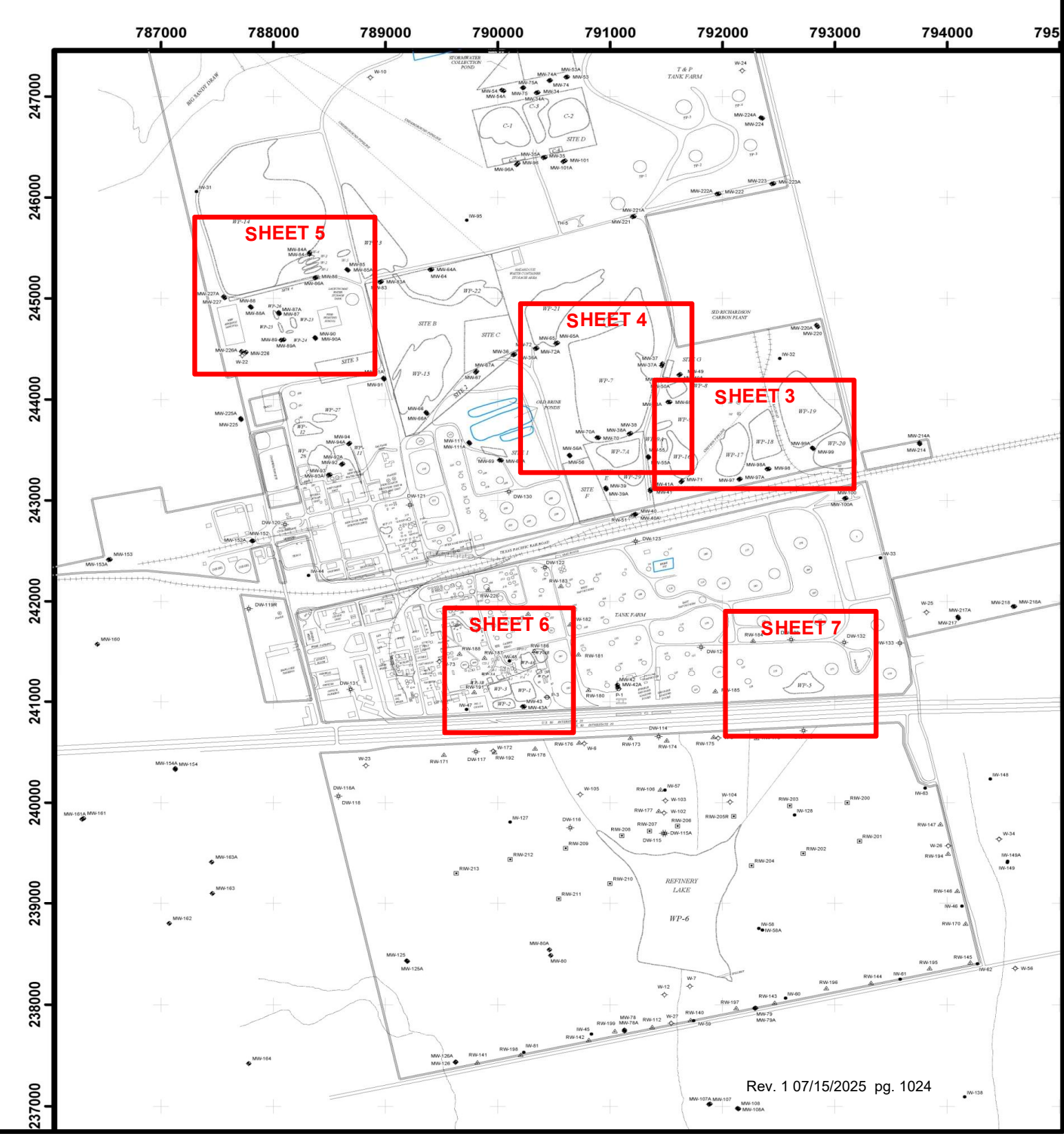
SECTION IX
APPENDIX III
EVIDENCE OF RELEASE

IX.B., Attachment III, Sheet 1 of 7
Reports Documenting Released to Soil and Water

Unit	Groundwater Impact Investigation Reports		Soil Impact Investigation Reports		No Further Action Letter
	Submitted	Approved	Submitted	Approved	
A1	30-Jan-1993	19-Oct-1993	31-Aug-2005	9-Jan-2006	30-May-2007
A2	30-Jan-1993	19-Oct-1993	31-Aug-2005	9-Jan-2006	30-May-2007
A3	30-Jan-1993	19-Oct-1993	31-Aug-2005	9-Jan-2006	30-May-2007
CS-1	30-Jan-1993	19-Oct-1993	31-Aug-2005	9-Jan-2006	30-May-2007
CS-A	na	na	na	na	ACTIVE
CS-B	na	na	na	na	ACTIVE
CS-C	na	na	na	na	ACTIVE
FFA	25-Oct-1993	19-Jan-1995	8-May-2000	26-May-2000	29-Jan-2002
LEAD AREA	16-Sep-1992	19-Jan-1995	12-Dec-2003	12-Apr-2004	23-Jul-2003
SITE 1	16-Sep-1992	19-Jan-1995	26-Mar-2003	23-Jul-2003	23-Jul-2003
SITE 2	25-Oct-1993	19-Jan-1995	11-Sep-2001	29-Jan-2002	29-Jan-2002
SITE 3	25-Oct-1993	19-Jan-1995	10-Nov-2000	2-Feb-2001	2-Feb-2001
SITE 4	16-Sep-1992	19-Jan-1995	26-Mar-2003	23-Jul-2003	23-Jul-2003
SITE B	16-Sep-1992	19-Jan-1995	26-Mar-2003	23-Jul-2003	23-Jul-2003
SITE C	25-Oct-1993	19-Jan-1995	12-Dec-2003	12-Apr-2004	23-Jul-2003
SITE D - Cell #1	25-Oct-1993	19-Jan-1995	12-Dec-2003	12-Apr-2004	23-Jul-2003
SITE D - Cell #2	25-Oct-1993	19-Jan-1995	12-Dec-2003	12-Apr-2004	23-Jul-2003
SITE D - Cell #3	25-Oct-1993	19-Jan-1995	12-Dec-2003	12-Apr-2004	23-Jul-2003
SITE D - Cell #4	25-Oct-1993	19-Jan-1995	12-Dec-2003	12-Apr-2004	23-Jul-2003
SITE D - Cell #5	6-Feb-1996	14-Aug-1996	6-Feb-1996	14-Aug-1996	Post Closure
SITE E	na	na	na	na	ACTIVE
SITE F	na	na	na	na	ACTIVE
SITE G	na	na	na	na	Post Closure
SITE H	na	na	na	na	ACTIVE
SITE J	na	na	na	na	ACTIVE
SITE K	na	na	na	na	ACTIVE
SITE L	25-Oct-1993	19-Jan-1995	12-Dec-2003	12-Apr-2004	23-Jul-2003
SITE LF-1	30-Jan-1993	19-Oct-1993	31-Aug-2005	9-Jan-2006	30-May-2007
T176	30-Jan-1993	19-Oct-1993	31-Aug-2005	9-Jan-2006	30-May-2007
T38	30-Jan-1993	19-Oct-1993	31-Aug-2005	9-Jan-2006	30-May-2007
T52	30-Jan-1993	19-Oct-1993	31-Aug-2005	9-Jan-2006	30-May-2007
V2	30-Jan-1993	19-Oct-1993	31-Aug-2005	9-Jan-2006	30-May-2007
V3	30-Jan-1993	19-Oct-1993	31-Aug-2005	9-Jan-2006	30-May-2007
V4	30-Jan-1993	19-Oct-1993	31-Aug-2005	9-Jan-2006	30-May-2007
VFD-1	25-Oct-1993	19-Jan-1995	10-Nov-2000	2-Feb-2001	2-Feb-2001
W-1	25-Oct-1993	19-Jan-1995	10-Nov-2000	2-Feb-2001	2-Feb-2001
W-2	25-Oct-1993	19-Jan-1995	10-Nov-2000	2-Feb-2001	2-Feb-2001
W-3	25-Oct-1993	19-Jan-1995	10-Nov-2000	2-Feb-2001	11-Apr-2005
W-4	25-Oct-1993	19-Jan-1995	10-Nov-2000	2-Feb-2001	2-Feb-2001
W-5	25-Oct-1993	19-Jan-1995	12-Dec-2003	12-Apr-2004	23-Jul-2003
Waste Pile	30-Jan-1993	19-Oct-1993	31-Aug-2005	9-Jan-2006	30-May-2007
WP-1	30-Jan-1993	19-Oct-1993	31-Aug-2005	9-Jan-2006	15-Dec-1993
WP-2	30-Jan-1993	19-Oct-1993	31-Aug-2005	9-Jan-2006	30-May-2007
WP-3	30-Jan-1993	19-Oct-1993	31-Aug-2005	9-Jan-2006	30-May-2007
WP-3A	30-Jan-1993	19-Oct-1993	31-Aug-2005	9-Jan-2006	30-May-2007

IX.B., Attachment III, Sheet 1 of 7
Reports Documenting Released to Soil and Water

Unit	Groundwater Impact Investigation Reports		Soil Impact Investigation Reports		No Further Action Letter
	Submitted	Approved	Submitted	Approved	
WP-3B	30-Jan-1993	19-Oct-1993	31-Aug-2005	9-Jan-2006	30-May-2007
WP-4	30-Jan-1993	19-Oct-1993	31-Aug-2005	9-Jan-2006	30-May-2007
WP-4A	30-Jan-1993	19-Oct-1993	31-Aug-2005	9-Jan-2006	30-May-2007
WP-4B	30-Jan-1993	19-Oct-1993	31-Aug-2005	9-Jan-2006	30-May-2007
WP-5	30-Jan-1993	19-Oct-1993	31-Aug-2005	9-Jan-2006	30-May-2007
WP-6	16-Sep-1992	19-Jan-1995	12-Dec-2003	12-Apr-2004	8-Jul-2005
WP-7	6-Feb-1996	14-Aug-1996	6-Feb-1996	14-Aug-1996	Jul-26-1995
WP-7A	16-Sep-1992	19-Jan-1995	10-Nov-2000	2-Feb-2001	2-Feb-2001
WP-8	16-Sep-1992	19-Jan-1995	10-Nov-2000	2-Feb-2001	2-Feb-2001
WP-9	16-Sep-1992	19-Jan-1995	10-Nov-2000	2-Feb-2001	2-Feb-2001
WP-9A	25-Oct-1993	19-Jan-1995	11-Sep-2001	29-Jan-2002	13-Dec-2005
WP-11	25-Oct-1993	19-Jan-1995	11-Sep-2001	29-Jan-2002	13-Dec-2005
WP-12	25-Oct-1993	19-Jan-1995	12-Dec-2003	12-Apr-2004	8-Jul-2005
WP-13	25-Oct-1993	19-Jan-1995	12-Dec-2003	12-Apr-2004	8-Jul-2005
WP-14	16-Sep-1992	19-Jan-1995	12-Dec-2003	12-Apr-2004	23-Jul-2003
WP-15	25-Oct-1993	19-Jan-1995	10-Nov-2000	2-Feb-2001	2-Feb-2001
WP-16	25-Oct-1993	19-Jan-1995	10-Nov-2000	2-Feb-2001	2-Feb-2001
WP-17	25-Oct-1993	19-Jan-1995	10-Nov-2000	2-Feb-2001	2-Feb-2001
WP-18	25-Oct-1993	19-Jan-1995	10-Nov-2000	2-Feb-2001	2-Feb-2001
WP-19	25-Oct-1993	19-Jan-1995	10-Nov-2000	2-Feb-2001	2-Feb-2001
WP-20	16-Sep-1992	19-Jan-1995	12-Dec-2003	12-Apr-2004	8-Jul-2005
WP-21	16-Sep-1992	19-Jan-1995	12-Dec-2003	12-Apr-2004	23-Jul-2003
WP-22	25-Oct-1993	19-Jan-1995	11-Sep-2001	29-Jan-2002	29-Jan-2002
WP-23	25-Oct-1993	19-Jan-1995	11-Sep-2001	29-Jan-2002	29-Jan-2002
WP-24	25-Oct-1993	19-Jan-1995	11-Sep-2001	29-Jan-2002	29-Jan-2002
WP-25	25-Oct-1993	19-Jan-1995	11-Sep-2001	29-Jan-2002	29-Jan-2002
WP-26	25-Oct-1993	19-Jan-1995	11-Sep-2001	29-Jan-2002	29-Jan-2002
WP-27	25-Oct-1993	19-Jan-1995	11-Sep-2001	29-Jan-2002	13-Dec-2005
WP-28	6-Feb-1996	14-Aug-1996	6-Feb-1996	14-Aug-1996	Jul-26-1995
WP-29	na	na	9-Aug-2006	4-Dec-2006	15-Sep-2010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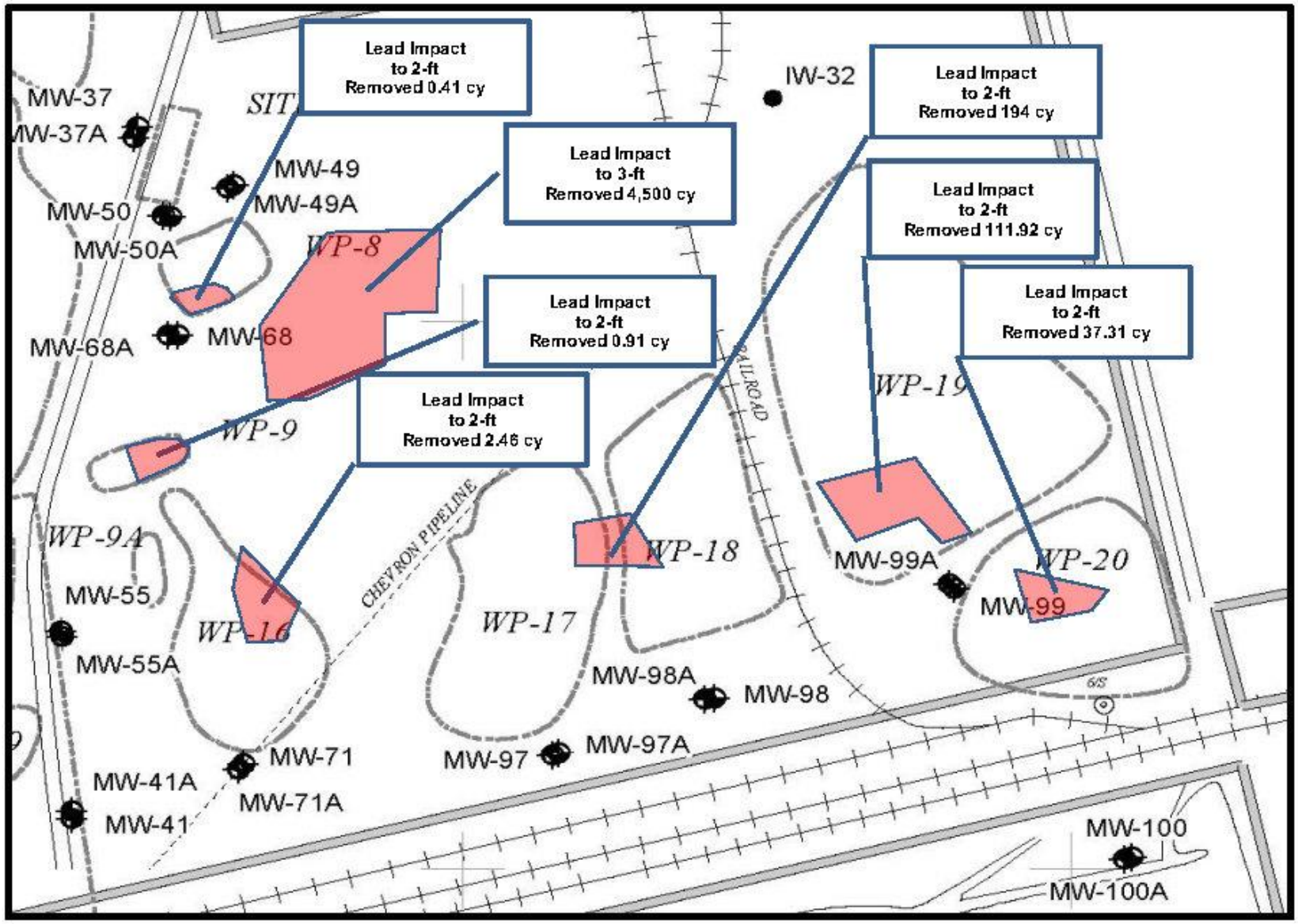
237000
SHEET 5
SHEET 4
SHEET 3
SHEET 6
SHEET 7
BIG SANDY DRAW
STORMWATER COLLECTION POND
T & P TANK FARM
SITE D
SITE B
SITE C
SITE 3
SITE 2
SITE 1
SITE F
SITE G
OLD BRINE PONDS
SID RICHARDSON CARBON PLANT
TEXAS PACIFIC RAILROAD
TANK FARM
REFINERY LAKE
WP-6

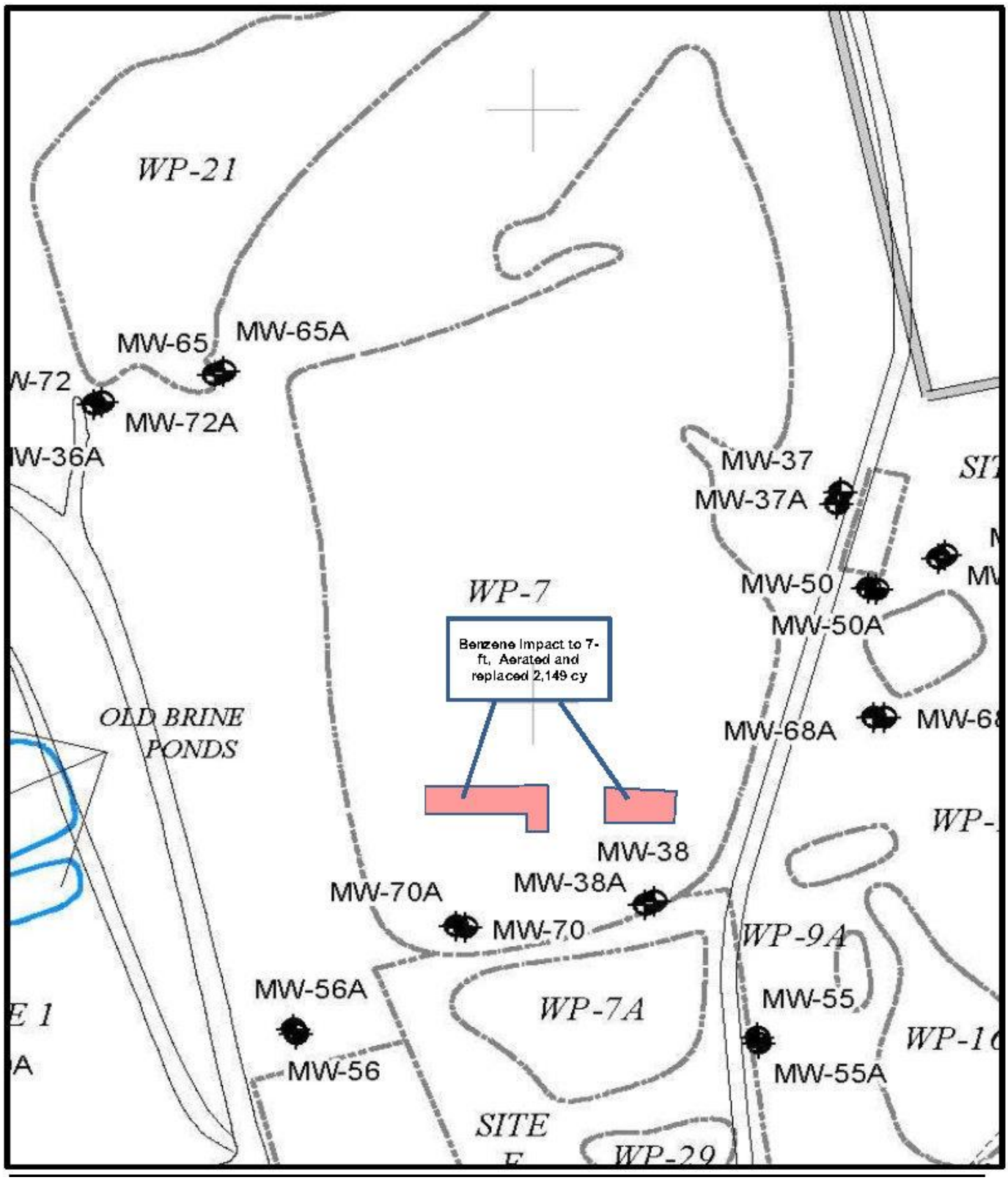
IX.B., Attachment III, Sheet 3 of 8 Waste Impacted Soils Remediation

MAP SHEET	SWMU	CONSTITUENT	REMEDIATION			
			AREA sq ft	DEPTH feet	REMOVED cu yds	TYPE DISPOSAL
Sheet 6	A1	Naphthalene	API Sep.	7	55	Off-Site Disposal
Sheet 5	W-3	Lead	5,021	2	0.23	Off-Site Disposal
Sheet 5	W-3	Styrene	4,021	2	0.18	Off-Site Disposal
Sheet 5	W-4	Benzene	5,097	2	0.23	On-Site Treatment
Sheet 6	WP-4A	Benzene/Benzenethiol	13,300	8 - 12	493	On-Site Treatment
Sheet 6	WP-4A	Lead	215	5	40	Off-Site Disposal
Sheet 7	WP-5	Benzenethiol	219	8	65	On-Site Treatment
Sheet 4	WP-7	Benzene	9,488	5 - 7	2,149	On-Site Treatment
Sheet 3	WP-8	Lead	8,874	2	0.41	Off-Site Disposal
Sheet 3	WP-9	Lead	19,768	2	0.91	Off-Site Disposal
Sheet 3	WP-16	Lead	53,501	2	2.46	Off-Site Disposal
Sheet 3	WP-17	Lead	42.3	2	48.46	Off-Site Disposal
Sheet 3	WP-18	Lead	126.8	2	145.37	Off-Site Disposal
Sheet 3	WP-19	Lead	97.7	2	111.92	Off-Site Disposal
Sheet 3	WP-20	Lead	32.6	2	37.31	Off-Site Disposal
Sheet 5	WP-26	Lead	14,218	3	1,580	Off-Site Disposal
Sheet 3	Lead Area	Lead	40,200	3	4,500	Off-Site Disposal

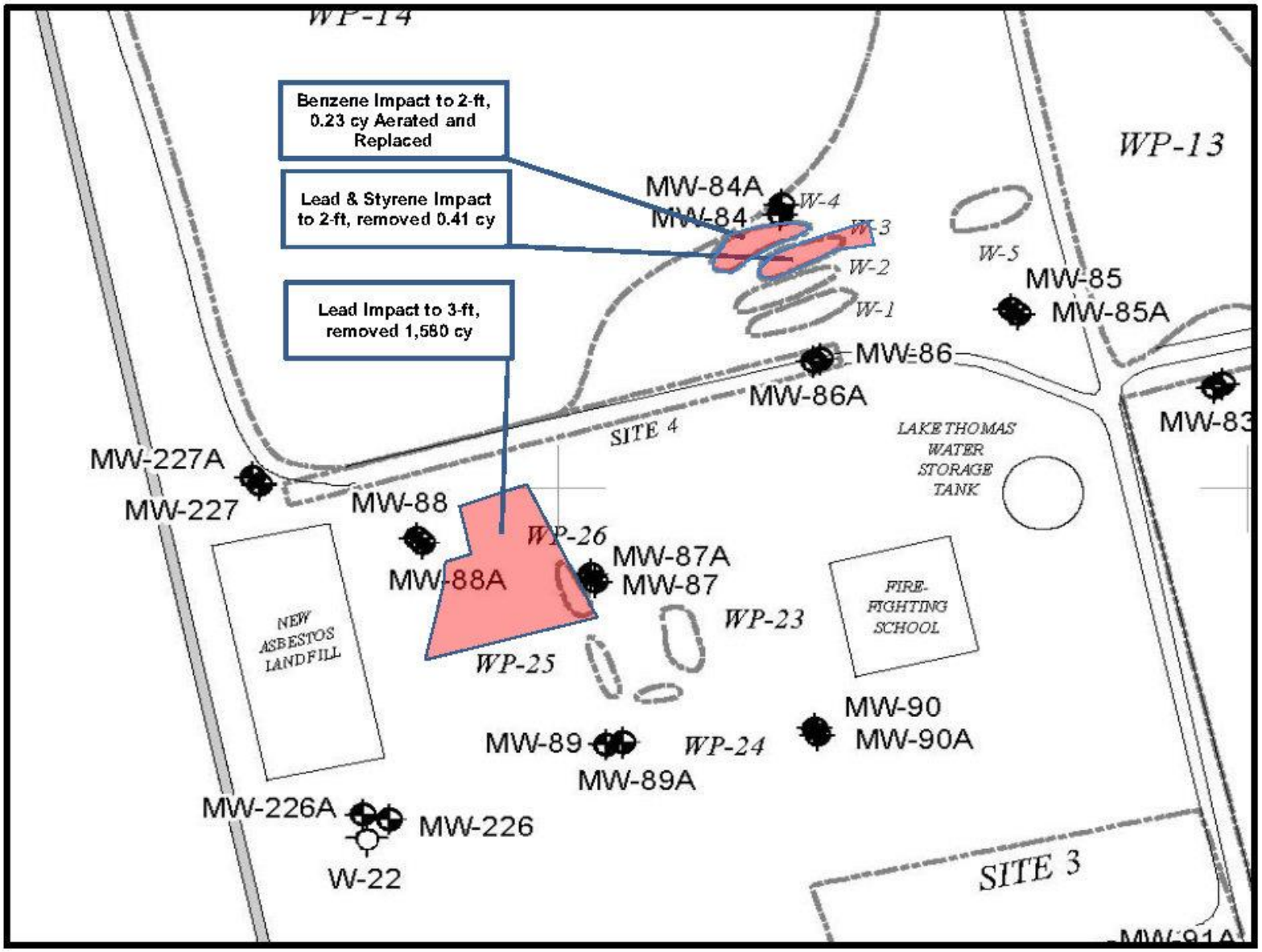
Location Map of Known Releases (RFI Phase I, Subphases 1, 2, and 3 Areas)



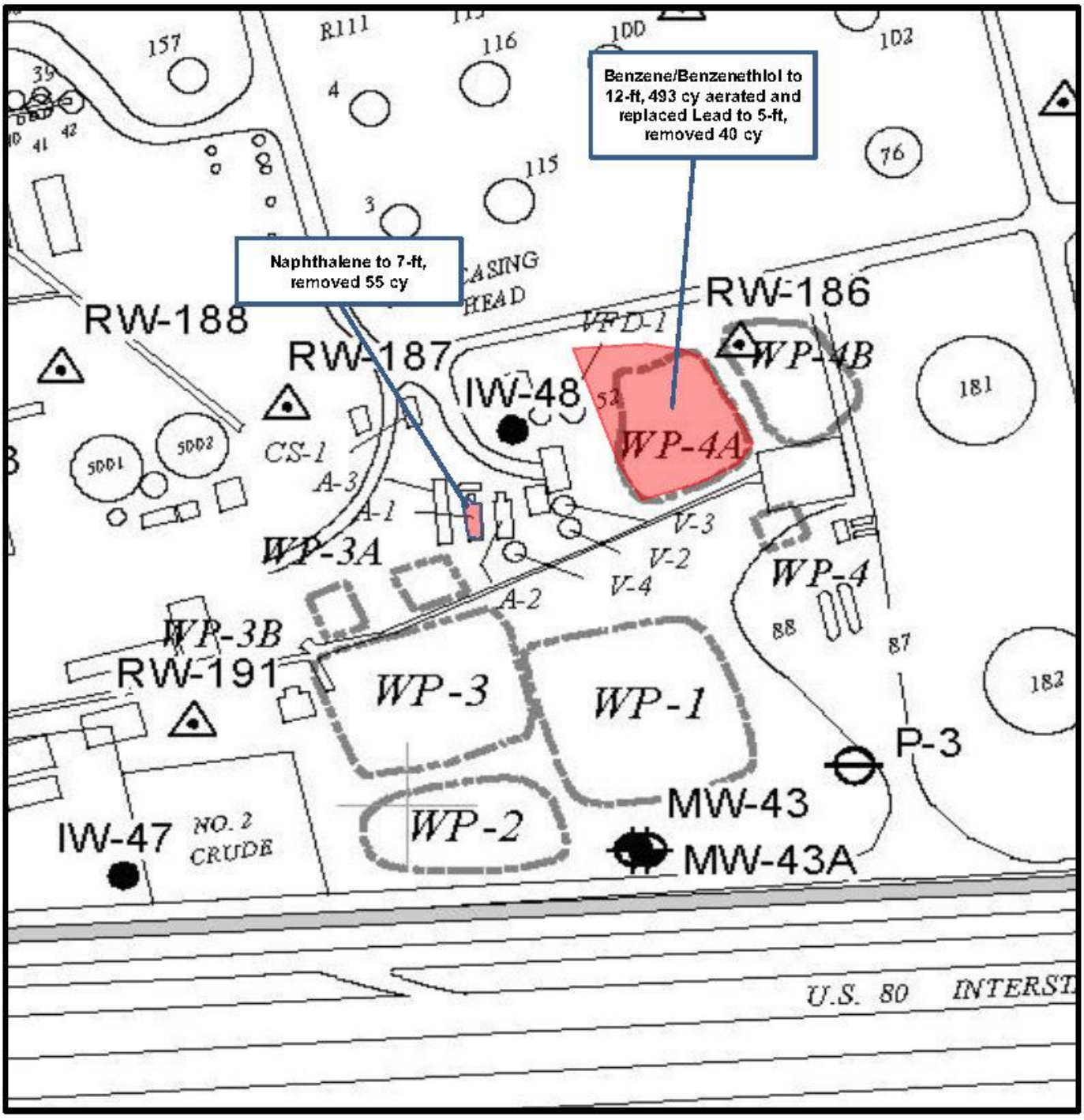
Location Map of Known Releases (RFI Phase II, Subphase 2 area)



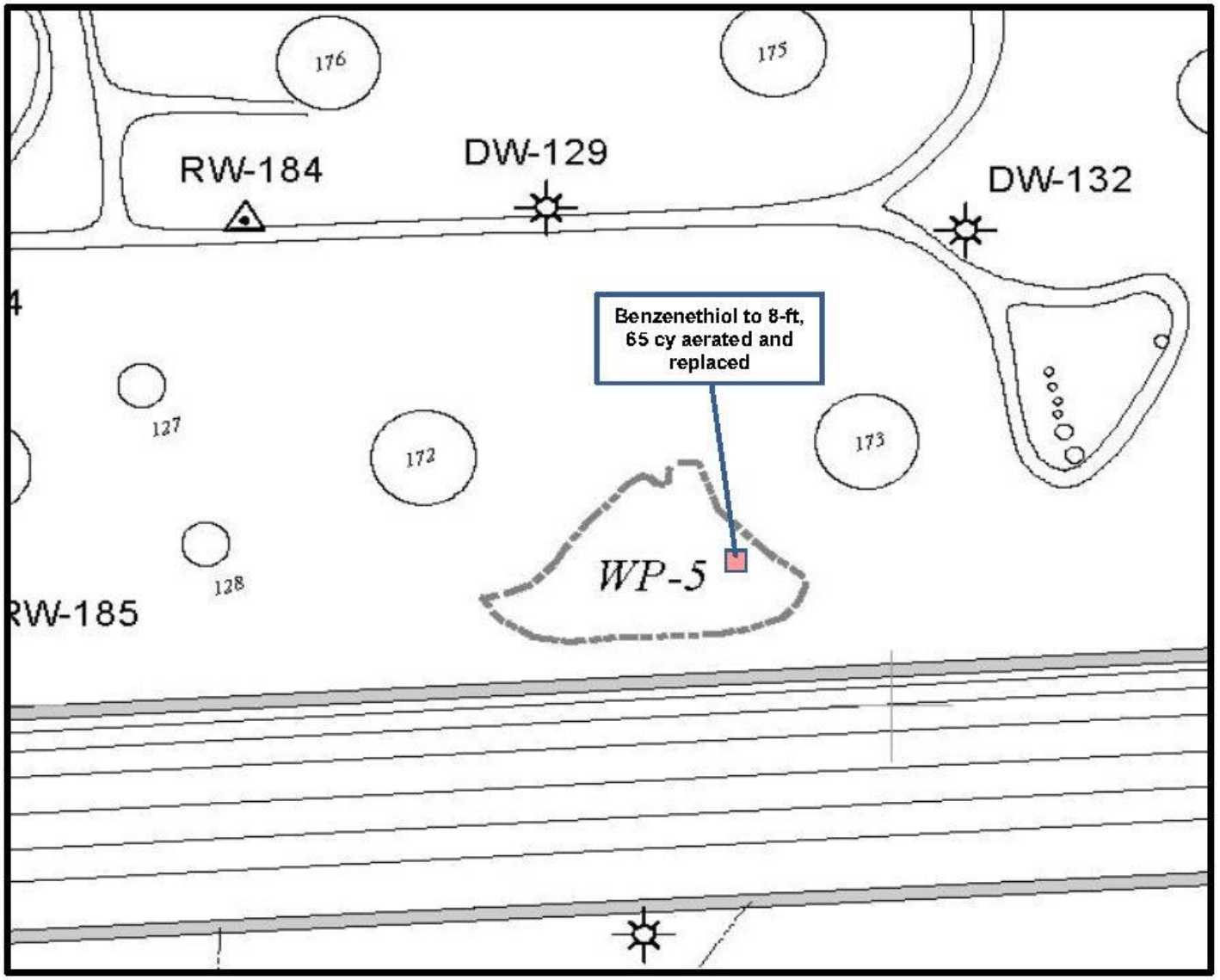
Location Map of Known Releases (RFI Phase I, Subphases 4 and 5 Areas)



Location Map of Known Releases (RFI Group 3 and 4 Areas)



IX.B., Attachment III, Sheet 8 of 8 Location Map of Known Releases (RFI Group 3 Area)



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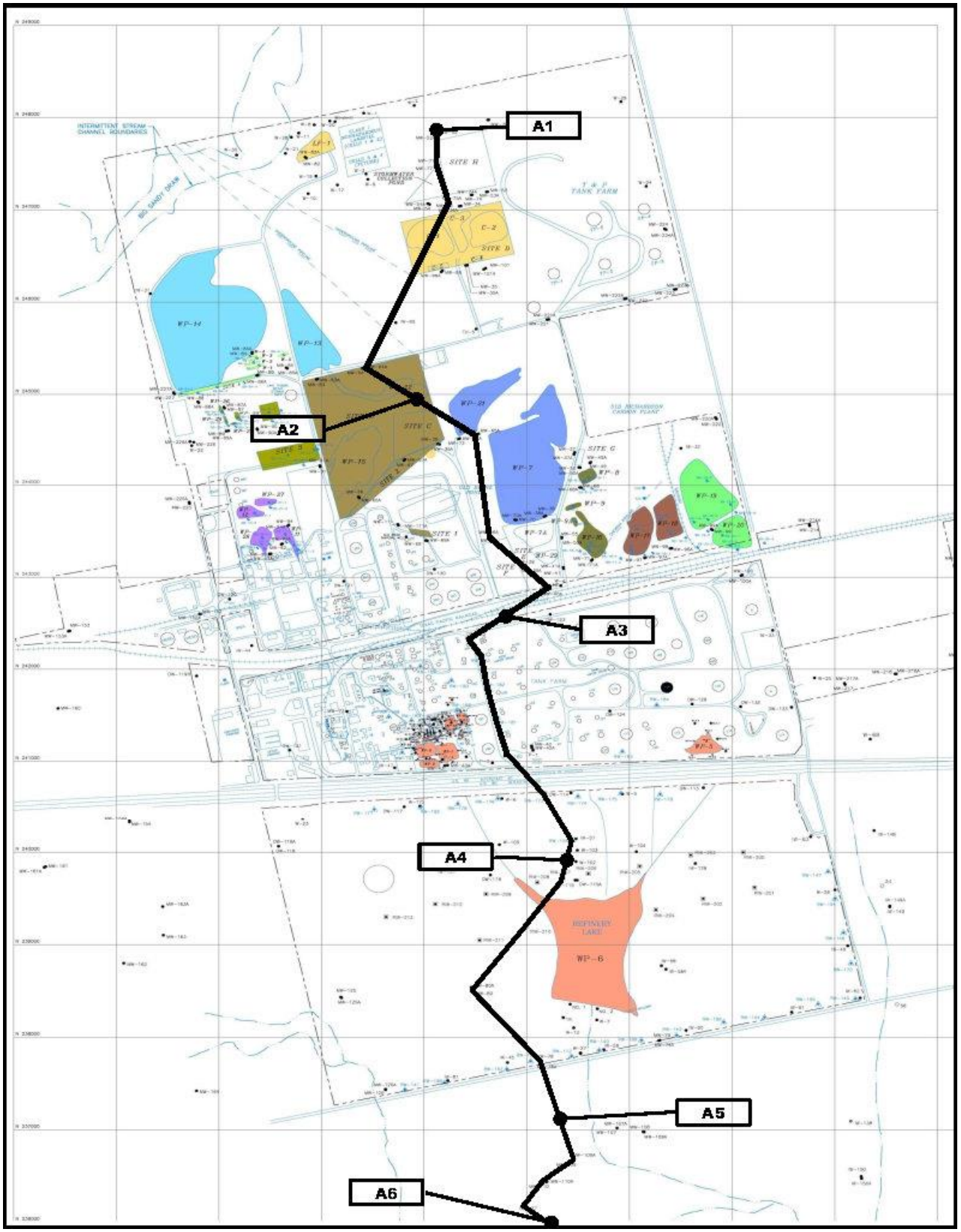
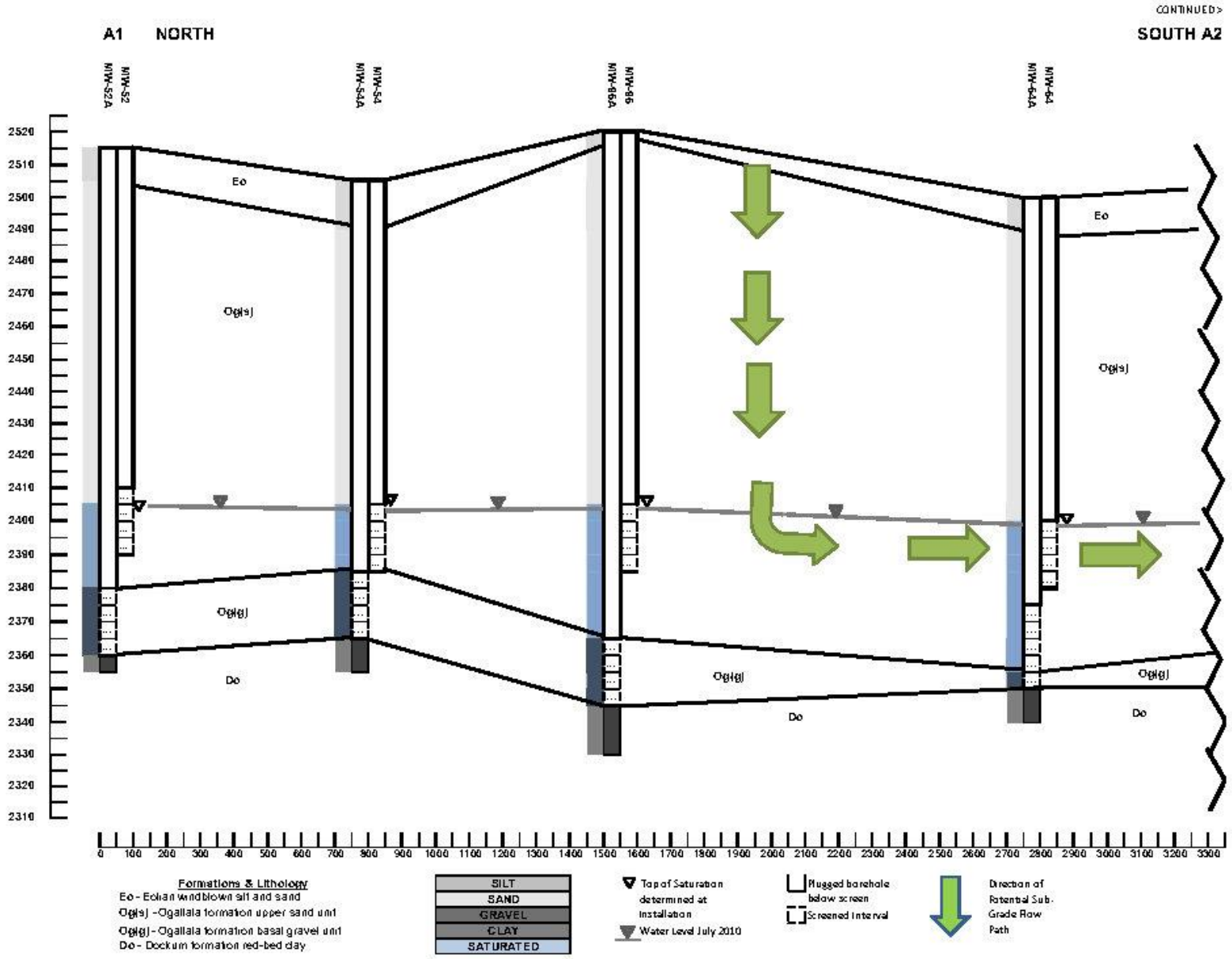
SECTION IX
APPENDIX IV
POLLUTANT DISPERSAL PATHWAYS

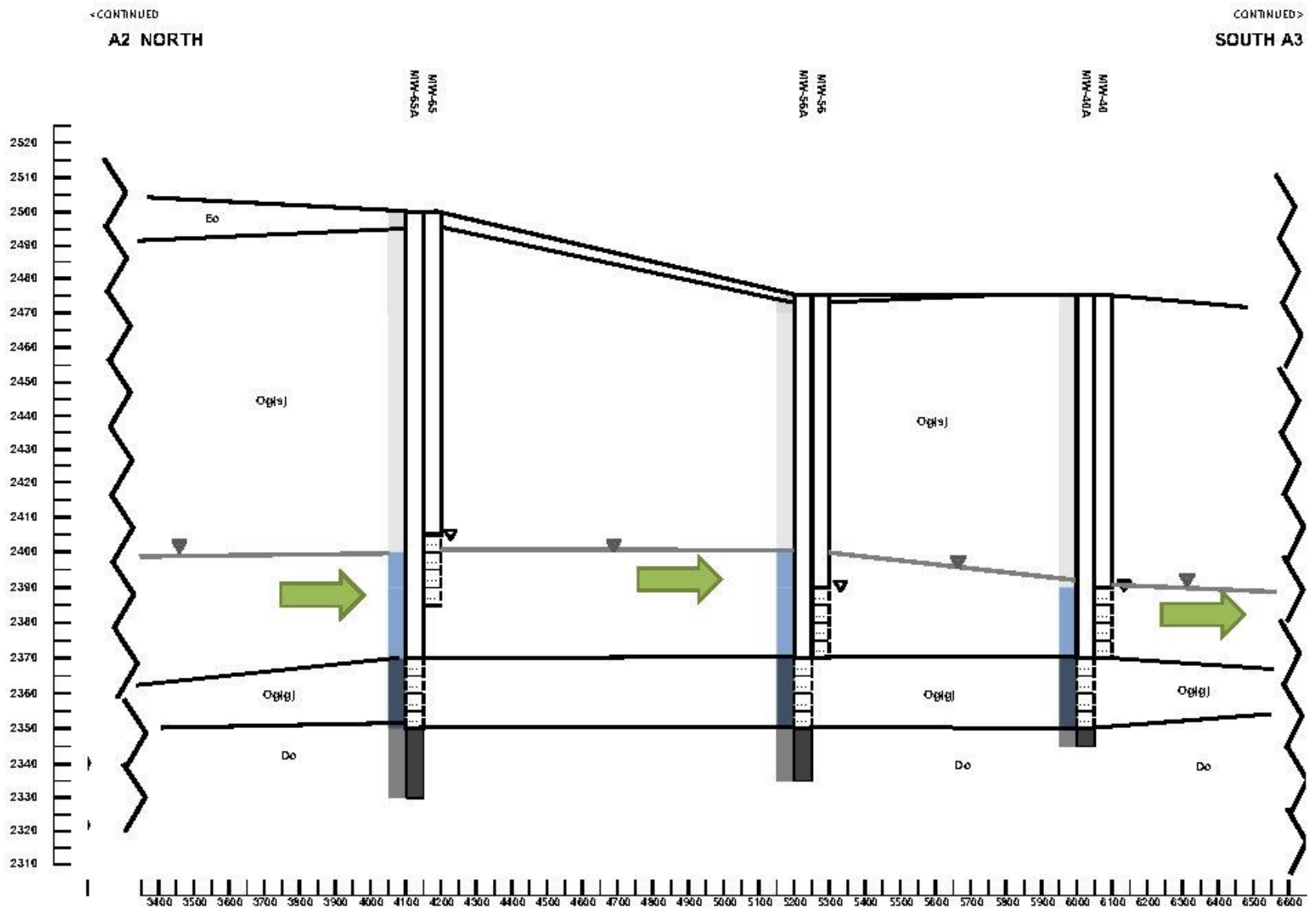
XI.B, Appendix IV [Sheet 1 of 6] Line of Facility Cross-Section



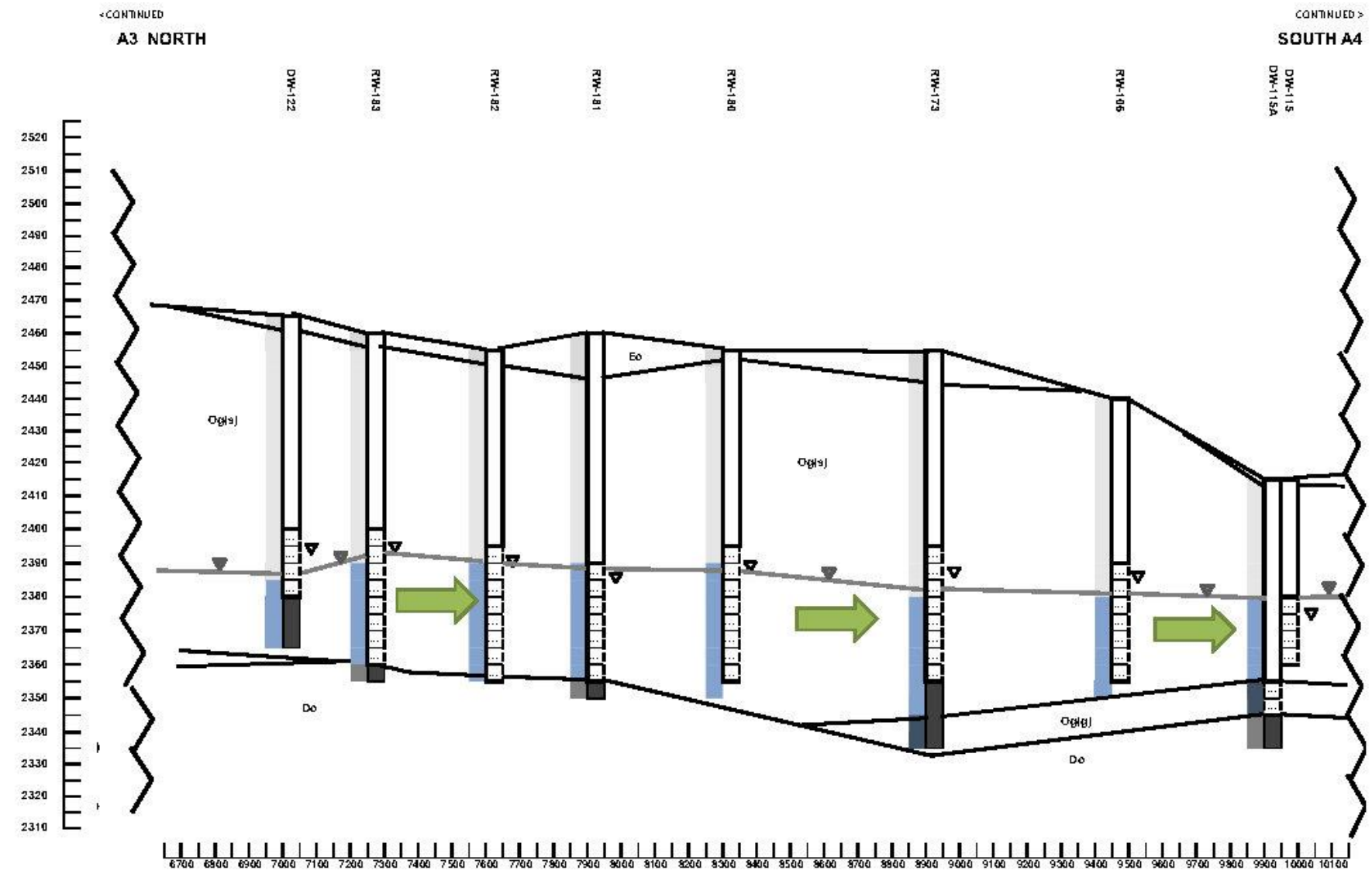
XI.B. Appendix IV [Sheet 2 of 6] North to South Facility Cross-Section With Potential Subsurface Contaminate Flow Paths



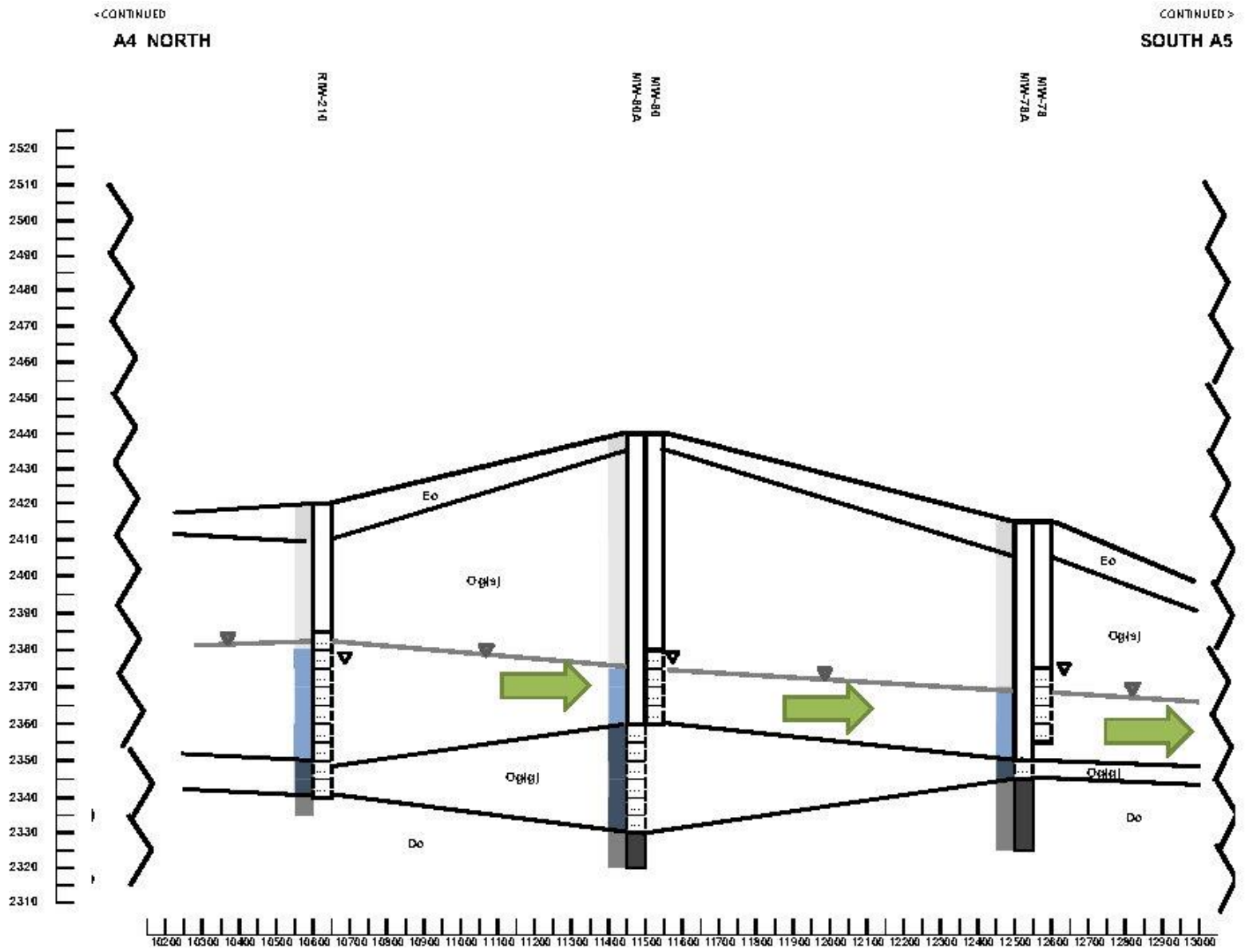
XI.B. Appendix IV [Sheet 3 of 6] North to South Facility Cross-Section With Potential Subsurface Contaminate Flow Paths



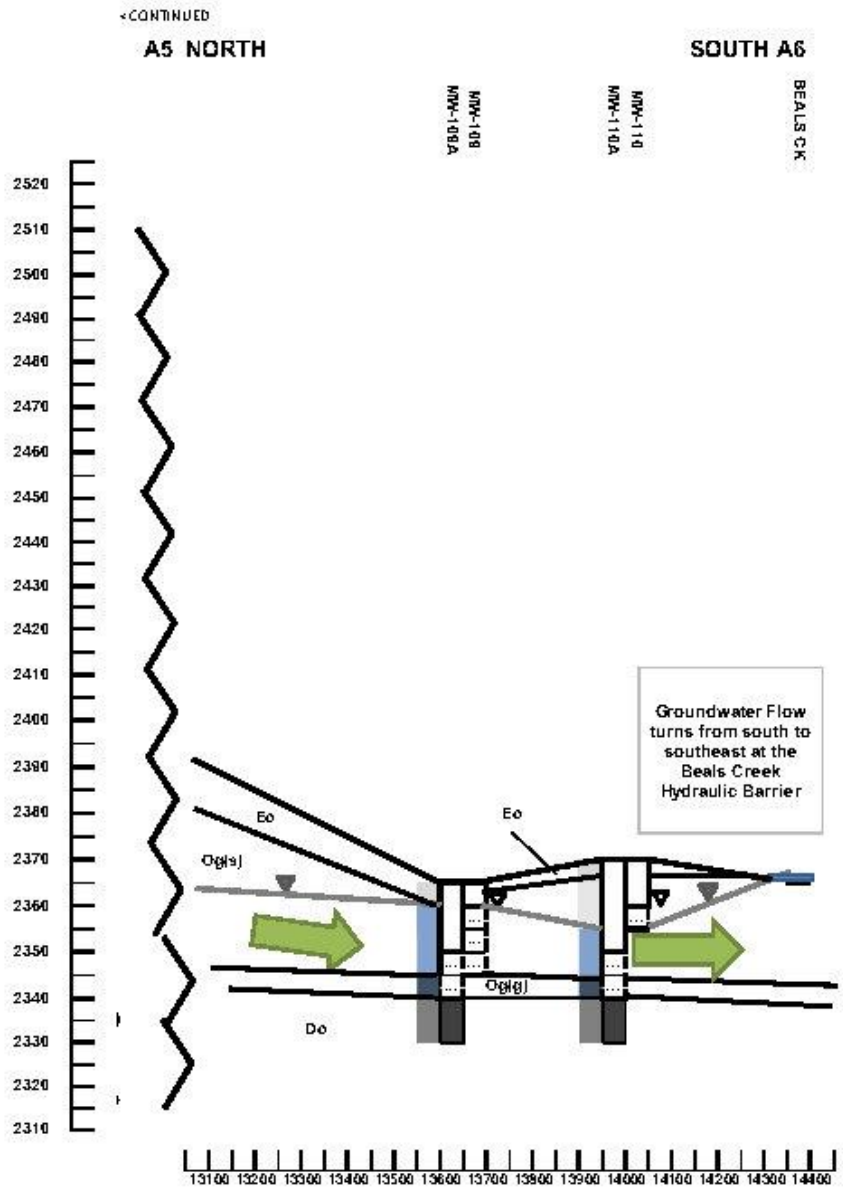
XI.B. Appendix IV [Sheet 4 of 6] North to South Facility Cross-Section With Potential Subsurface Contaminate Flow Paths



XI.B. Appendix IV [Sheet 5 of 6] North to South Facility Cross-Section With Potential Subsurface Contaminate Flow Paths



XI.B. Appendix IV [Sheet 6 of 6] North to South Facility Cross-Section With Potential Subsurface Contaminate Flow Paths



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SECTION X
AIR EMISSION STANDARDS

X. Air Emission Standards

Provide all Part B responsive information in Appendix X. When preparing the physical format organize your submittal using the Format of Hazardous Waste permit Application and Instructions.

Section X.D. applies to Permittees with "one- stop" permits applying for an amendment, modification, or renewal of the Air Permits Division portions of their combined "one-stop" permit.

A. Process Vents

Does the facility have process vents and equipment subject to the requirements of 40 CFR Part 264, Subpart AA?

If Yes: please provide a report that includes all of the information required by 40 CFR §270.24. Indicate on a facility plot plan the approximate location of process vents.

1. For incorporation into the permit, complete Table X.A - Process Vents for all vents on waste management units that manage hazardous waste with an annual average total organics concentration of 10 ppmw or greater ("process vents"). Specifically include:

   a. process vents on distillation, fractionation, thin-film evaporation, solvent extraction, air or steam stripping operations, and vents on condensers serving these operations; and

   b. process vents on tanks (e.g., distillate receivers, bottom receivers, surge control tanks, separator tanks, and hot wells) associated with distillation, fractionation, thin-film evaporation, solvent extraction, and air or steam stripping processes if emissions from these process operations are vented through the tanks.

      Emissions caused by natural means such as daily temperature changes or by tank loading and unloading are not subject to control.

2. For process vents, include the following certification as part of the air emissions report:

   I,_____*[owner or operator]*___, certify that the operating parameters used in the design analysis reasonably represent the conditions that exist when the hazardous waste management unit is or would be operating at the highest load or capacity level reasonably expected to occur.

   I further certify that the control device is designed to operate at an efficiency of 95 weight percent or greater.

   OR

   I further certify that the total organic emission limits of 40 CFR §264.1032(a) for affected process vents at the facility can be attained by a control device involving vapor recovery at an efficiency less than 95 weight percent.

   [Signature] _____ *[Date]* _____.

B. Equipment Leaks

Does the facility have equipment subject to the requirements of 40 CFR Part 264, Subpart BB?

If No: please provide the regulatory exclusion/exemption(s):

If Yes: please provide a report that includes all of the information required by 40 CFR §270.25.

1. For incorporation into the permit, complete Table X.B. - Equipment Leaks for all valves, pumps, compressors, pressure relief devices, sampling connection systems, and open-ended valves or lines that contain or contacts hazardous waste streams with organic concentrations of 10% by weight or greater. Equipment in vacuum service is not subject to control if identified in the facility operating record.

2. For equipment, include the following statement as part of the air emissions report:

   I,_____*[owner or operator]*___, certify that the operating parameters used in the design analysis reasonably represent the conditions that exist when the hazardous waste management unit is operating at the highest load or capacity level reasonably expected to occur.

   I further certify that the control device is designed to operate at an efficiency of 95 weight percent or greater.

   [Signature] _____ *[Date]* _____.

C. Tanks, Surface Impoundments, and Containers

Does the facility have tanks subject to the requirements of 40 CFR Part 264, Subpart CC?

☐ Yes ☐ No ☐ Not Applicable (no permitted tanks)

If No: provide the regulatory exception/exemption(s) for each tank subject to regulation under 40 CFR Part 264, Subpart J:

Does the facility have surface impoundments subject to the requirements of 40 CFR Part 264, Subpart CC?

☐ Yes ☐ No ☐ Not Applicable (no permitted surface impoundments)

If No: provide the regulatory exception/exemption(s) for each permitted surface impoundment subject to regulation under 40 CFR Part 264, Subpart K:

Does the facility have containers subject to the requirements of 40 CFR Part 264, Subpart CC?

☐ Yes ☐ No ☐ Not Applicable (no permitted container storage areas)

If No: provide the regulatory exception/exemption(s) applicable to the authorized containers subject to regulation under 40 CFR Part 264, Subpart I:

If the facility contains tanks, surface impoundments, and containers subject to the requirements of 40 CFR Part 264 Subpart CC, please provide a report that includes all of the information required by 40 CFR §270.27.

1. For incorporation into the permit, complete Table X.C.

2. As applicable, include the following floating roof cover certification as part of the air emissions report for tanks:

   I,_____*[owner or operator]*___, certify that the floating roof cover meets the applicable design specifications as listed in 40 CFR §264.1084(e)(1) or 40 CFR §264.1084(f)(1).

   [Signature] _____ *[Date]* _____.

3. As applicable, include the following floating membrane cover certification as part of the air emissions report for surface impoundments:

   I,_____*[owner or operator]*___, certify that the floating membrane cover meets the applicable design specifications listed in 40 CFR §264.1085(c)(1).

   [Signature] _____ *[Date]* _____.

4. As applicable, include the following container certification as part of the air emissions report for containers:

   I,_____*[owner or operator]*___, certify that the requirements of 40 CFR Part §264, Subpart CC, are met for all containers subject to control.

   [Signature] _____ *[Date]* _____.

5. As applicable, include the following control device certification as part of the air emissions report:

   I,_____*[owner or operator]*___, certify that the control device is designed to operate at the performance level documented by a design analysis as specified in 40 CFR 264.1089 (e)(1)(ii) or by performance tests as specified in 40 CFR §264.1089(e)(1)(iii) when the tank, surface impoundment, or container is or would be operating at capacity or the highest level reasonably expected to occur.

   [Signature] _____ *[Date]* _____.

D. "One-Stop" Permits: - RESERVED

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Alon USA Big Spring Refinery
Big Spring, TX

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APPENDIX X
APPLICATION RESPONSES
Air Emission Standards

Supplemental Table X. - SECTION X – AIR EMISSION STANDARDS SUPPLEMENTAL INFORMATION:

SECTION	DESCRIPTION	RESPONSE
X.	General Statement	Section X does not apply for this application because Alon has provided all relevant air emissions data in Permit-by-rule (PBR) authorization documentation as required under 30 TAC 106.4 and under the individual PBR sections that were used to authorize air emissions from the existing groundwater recovery systems. As part of this RCRA permit renewal project, Alon is not proposing to make any physical changes or changes to the method of operation for any emission sources associated with the existing groundwater recovery system. Additional technical information on the groundwater recovery system is included in Attachment XI.D.3c.(2)(a) of this application.
X.A	Process Vents	The groundwater recovery system at the Big Spring Refinery includes two process vents. One vent is from the first groundwater air stripper and the other is from the second groundwater air stripper. The air stripper vents are routed through carbon canisters to reduce VOC emissions before venting to atmosphere. Subsection X.A does not apply as discussed above for the entire Section X.
X.B.	Equipment Leaks	The groundwater recovery system at the Big Spring Refinery includes piping equipment for conveying recovered groundwater from the recovery wells to the treatment system and for conveying stripped groundwater to the injection wells. Subsection X.B does not apply as discussed above for the entire Section X
X.C.	Tanks, Surface Impoindments, and Containers	The groundwater recovery system at the Big Spring Refinery includes three storage tanks. Two tanks (73TK-001 and 73TK-0112) are for storing recovered groundwater and one tank (73TK-013) is for storing stripped groundwater. Subsection X.C does not apply as discussed above for the entire Section X.
X.D.	Optional TCEQ Office of Air Quality Information	Alon does not have and is not requesting a “one stop” permit. Subsection X.D does not apply as discussed above for the entire Section X.

Alon USA, LP
Alon USA Big Spring Refinery
Big Spring, TX

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Part B Application
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SECTION XI
COMPLIANCE PLAN

XI. Compliance Plan

Provide all Part B responsive information in Appendix XI. When preparing the physical format organize your submittal using the Format of Hazardous Waste permit Application and Instructions.

Groundwater Monitoring and Corrective Action Requirements for Regulated Units

Owners or operators of facilities that process, store, or dispose of hazardous waste may be required to establish groundwater monitoring and response programs in accordance with the provisions of 30 TAC 335.157. There are three types of groundwater monitoring programs which may be addressed in a Compliance Plan Application for Regulated Units: i) detection monitoring, ii) compliance monitoring, and iii) corrective action monitoring. The applicability of these various monitoring programs and the associated application requirements are illustrated in Figure 2 of the Compliance Plan Application instructions and further outlined below. A Compliance Plan Application will be required to be submitted when establishing a new compliance plan or incorporating changes in an existing compliance plan.

Detection Monitoring: An owner/operator required to conduct detection monitoring per the requirements of 30 TAC 335.164 must monitor for indicator parameters, such as specific conductance, total organic carbon, and total organic halogen, as well as chemical parameters and hazardous constituents specified in the facility permit. If a statistically significant increase in any parameter or hazardous constituent specified in the facility permit is detected in any monitoring well down gradient of the compliance point, the owner/operator must sample the groundwater in all monitoring wells and analyze the samples for the presence of 40 CFR Part 264 Appendix IX hazardous constituents. As shown in the accompanying Flow Diagram (see Figure 2), if the analytical results confirm the presence of Appendix IX constituents down gradient of the compliance point, the owner/operator must submit a Compliance Plan Application to establish a compliance monitoring program or corrective action program.

Compliance Monitoring: The requirements for compliance monitoring programs are detailed in 30 TAC 335.165. Owners/operators required to establish a compliance monitoring program must monitor the groundwater to determine whether Regulated Units are in compliance with the Groundwater Protection Standard (GWPS) specified in the compliance plan (see 30 TAC 335.158 .160). If a statistically significant increase above the GWPS in any chemical parameter or hazardous constituent specified in the compliance plan is confirmed, the owner/operator must submit a application to modify the compliance plan to establish a corrective action program in accordance with 30 TAC 335.166 (see Figure 2). If no such exceedance of the GWPS is detected for three consecutive years and the applicable compliance period has expired, the owner/operator must apply for modification of the compliance plan to re-establish a detection monitoring program for the unit. No further monitoring may be needed if the applicable post-closure care period for the unit is complete.

Regulated Unit Corrective Action Program: Owners/operators required to implement a corrective action program in accordance with the provisions of 30 TAC 335.166 must remove the hazardous waste constituents found in the groundwater or treat the groundwater in-place to levels equal to or less than the GWPS down gradient of the compliance point. The owner/operator must also establish and implement a groundwater monitoring program to demonstrate the effectiveness of the corrective action program. Corrective action measures may be terminated once the concentrations of hazardous constituents are reduced to levels equal to or below their respective concentration limits. After termination of the corrective action measures, the owner/operator must submit an application for modification of the compliance plan to re-establish a compliance monitoring program for the duration of the

compliance period (see Figure 2).

Groundwater Corrective Action Requirements for Solid Waste Management Units (SWMUs)

HSWA Solid Waste Management Unit (SWMU) Corrective Action Program: An owner/operator of a Permitted facility or an applicant applying for a hazardous waste permit is required to submit a Compliance Plan Application if hazardous constituents have been released from a SWMU and/or Area of Concern (AOC) to the groundwater and exceeds background or Practical Quantitation Limit (PQL) values, if under Risk Reduction Rules 30 TAC 335 and/or appropriate Protective Concentration Limits (PCLs), if under Texas Risk Reduction Program Rules 30 TAC 350. The Permitted facility must implement a corrective action program for SWMUs and/or AOCs in accordance with provisions 30 TAC 335.167 (see Figure 3, page 122 of the instructions for example of process-alternate, but equivalent process may be authorized by the Executive Director).

Compliance Plan Application Form Structure:

The Compliance Plan Application consists of Sections XI.A. through E.

Application Information Form:

This section contains detailed information necessary for the application and regulatory requirements needed to put in the final compliance plan.

The application form contains the following subsections:

A. Site Specific Information

B. Groundwater Protection Standard (GWPS)

C. Compliance Monitoring Program

D. Corrective Action Program

E. Cost Estimates for Financial Assurance

1. Table XI.E.1 Corrective Action Program Cost Estimate
2. Table XI.E.2.e Groundwater Monitoring Cost Estimate
3. Table XI.E.3. Financial Assurance Summary

CP Attachments:

A. Maps

B. Well Design and Construction Specifications

C. Sampling and Analysis Plan

Compliance Plan Site Specific Tables:

This section includes the following tables which are to be completed by the applicant, as applicable, and shall be incorporated as part of the final draft Compliance Plan. [Note: include a CD disk with the application providing an electronic copy of the files supporting the compliance plan tables, as applicable, in MS Word format]:

CP Table I - Waste Management Units and/or Areas Subject to Groundwater Corrective Action and Compliance Monitoring

CP Table II - Solid Waste Management Units and/or Areas of Concern for which Corrective Action applies pursuant to 30 TAC 335.167.

CP Table III - CORRECTIVE ACTION PROGRAM Table of Detected Hazardous and Solid

Waste Constituents and the Groundwater Protection Standard

CP Table IIIA - CORRECTIVE ACTION PROGRAM Table of Indicator Parameters and the Groundwater Protection Standard

CP Table IV - COMPLIANCE MONITORING PROGRAM Table of Hazardous and Solid Waste Constituents and Practical Quantitation Limits or Method Quantitation Limits for Compliance Monitoring

CP Table IVA - COMPLIANCE MONITORING PROGRAM Table of Detected Hazardous Constituents and the Groundwater Protection Standard for Compliance Monitoring

CP Table V - Designation of Wells by Function

CP Table VI - Compliance Period for RCRA-Regulated Units

CP Table VII - Reporting Requirements

CP Table VIII - Compliance Schedule

CP Table IX - Description of Uppermost Aquifer

Note to the Permittee: All responses to each item in Section XI of the application form should be submitted under Appendix XI- Compliance Plan. The applicant should use the PDF formatted Tables provided in the Part B application to include site-specific information that will become part of the final draft permit. For consistency, the PDF tables provided in the application are formatted to be accessible, and the agency will no longer accept site-specific tables created by the applicant. Do not delete any areas of the application form that are not applicable, submit answers to these areas with a response of either 'Reserved' or 'Not Applicable' in the Appendix XI. In addition, if material supporting a response is located elsewhere in the application, the response should provide details as to the specific location within the referenced material.

One of the primary goals of the performance based Compliance Plan is the wells listed in, CP Table V - Designation of Wells by Function (to be included in the final Compliance Plan) are the wells in which the GWPS must be met to verify compliance with Compliance Monitoring program or corrective action objectives, and to change the table would require a modification. On the other hand, the following types of wells Corrective Action Observation Wells, Corrective Action System well, etc., that are included in "Attachment A" maps of the final draft Compliance Plan, should be flexible. The purpose is to provide the permittee with the authority to alter the groundwater monitoring system and Corrective Action System designs, as necessary, to proactively address changing environmental conditions without modifying or amending the Compliance Plan. An application to modify/amend the compliance plan is only required if wells listed in CP Table V are changed; consequently, Corrective Action Observation and Corrective Action System Wells are not listed in CP Table V of the compliance plan so they may be added or removed without modifying/amending the compliance plan. Notification of proposed changes to the groundwater monitoring system and Corrective Action System designs can be included in the semiannual or annual report required by CP Table VIII - Compliance Schedule (to be included in the final Compliance Plan).

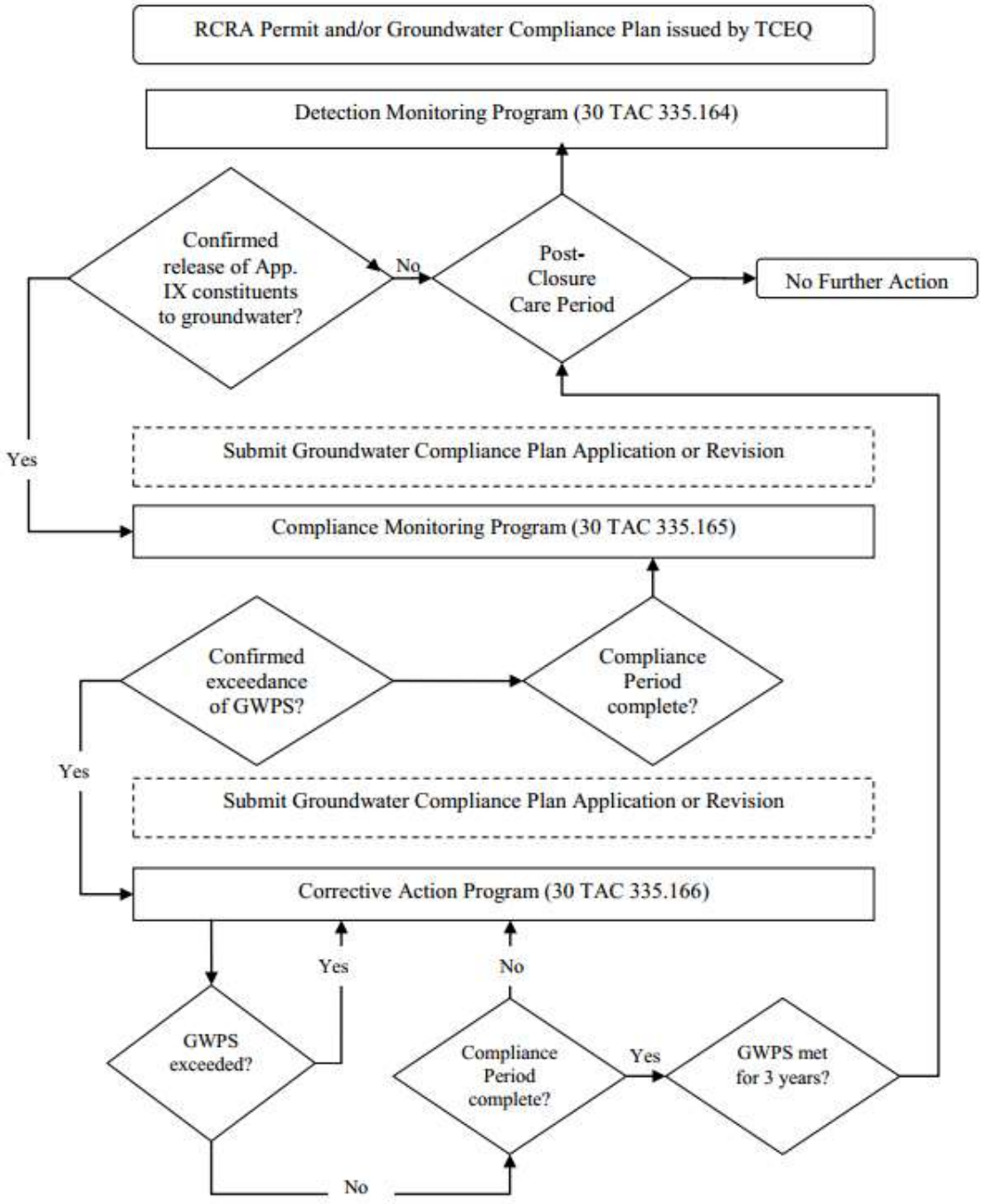
Figure 1 - Overview of Required Submittals And Revisions Associated with TCEQ Groundwater Compl

Type of Compliance Plan Application or Revision	Minimum Required Submittals				Additional Application Submi			
	Description of Modification	Public Notification Evidence	Fee Payment Evidence	Part B, Section I General Information	Section XI. A. Site-Specific Information	Section XI.B Groundwater Protection Standard	Section XI.C Compliance Monitoring Program	Sec X Corrective
RCRA Permitted Units								
Compliance Monitoring Program, Commencement or modification per 30 TAC 335.165.	•	•	•	•	•	•	•	
Corrective Action Program, commencement or modification per 30 TAC 335.166.	•	•	•	•	•	•	○	
Compliance Period, termination or extension per 30 TAC 335.162.	•	•	•	•	■	○	•	
Solid Waste Management Units								
Corrective Measure Implementation (CMI), per 30 TAC 335.167.	•	•	•	•	•	•	■	
Corrective Action Program termination.	•	•	•	•	■	○	•	

Note:

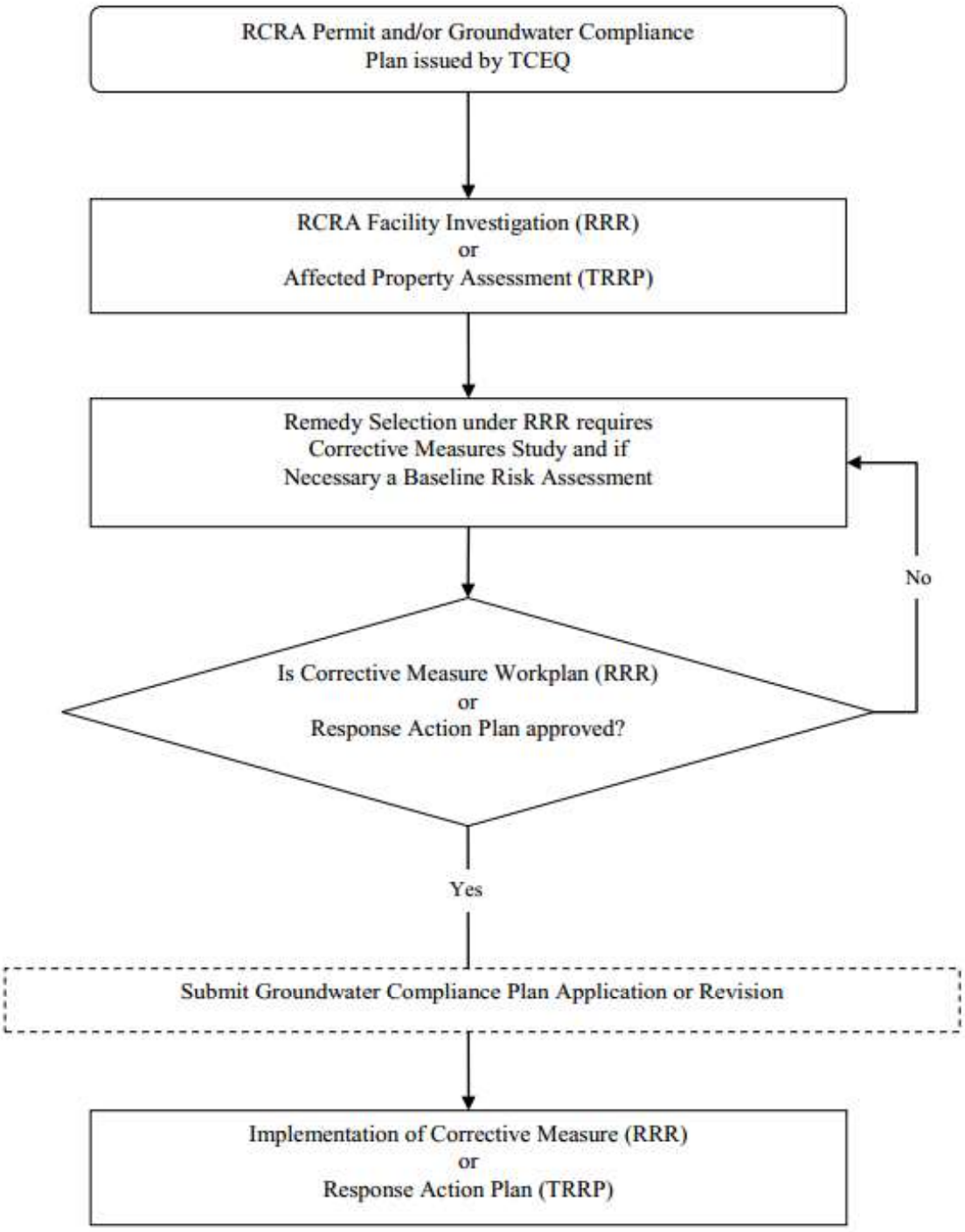
- • Submittal of additional or revised information required.
- ○ No submittal of additional or revised information required.
- ▪ Possible submittal of additional or revised information required

Figure 2 - Summary of Groundwater Monitoring and Compliance Plan Application Requirements for Regulated Waste Management Units (30 TAC 335 Subchapter F)



Note:
- GWPS = Groundwater Protection Standard (See Section XI.B. of this document, and 30 TAC 335.158 – 160)
- App. IX = Groundwater Monitoring List, 40 CFR 264 Appendix IX.
- Compliance Period = See Section XI.E. of this application, and 30 TAC 335.162.

Figure 3 - Summary of Compliance Plan Applications Requirements for Solid Waste Management Units (SMMUS) (30 TAC 335.167)



Note:
(RRR) – Risk Reduction Rules, 30 TAC 335
(TRRP) – Texas Risk Reduction Program, 30 TAC 350

A. Site Specific Information

1. General Site Information (provide the following information):

   a. An overall plan view map of the entire facility delineating the facility's property boundary, Facility Operations Area (FOA) boundaries, as applicable, and the plume management zone (PMZ) boundaries as applicable;

   All CP Attachment A Maps should be provided in Appendix XI of the application.

   b. A 7.5 minute U.S.G.S. quadrangle topographic map showing the entire facility;

      NOTE: This information is supplemental only and is not intended to be included as figures in the final draft permit.

   c. All oversized (larger than 8.5" by 11") drawings submitted in accordance with A, above, should be accompanied with legible photocopies of the reduced drawing on 8.5" by 11" sheet(s) of paper which shall be used as "CP Attachment A" maps in the final draft Permit/Compliance Plan. The applicant should title the map(s) accordingly as "CP Attachment A, Sheet 1 of xx - Facility Site Map"; "CP Attachment A, Sheet xx of xx, FOA Lateral Boundary Map"; "CP Attachment A, Sheet xx of xx, PMZ Boundary Location Map"; and

   d. Aerial photographs through time depicting changes in the land use, if available.

      NOTE: This information is supplemental only and is not intended to be included as figures in the final draft permit

2. Waste Management

   Provide a complete list and a plan view drawing(s) locating and identifying the following waste management units at the scale of 2.5 centimeters (1 inch) equal to not more than 61.0 meters (200 feet). All oversized (larger than 8.5" by 11") drawings should be accompanied with legible photocopies of the reduced drawing on 8.5" by 11" sheet(s) of paper. Please provide information for each waste management unit listed below on CP Table XI.A.1. - Facility History for Waste Management Units.

   All CP Attachment A Maps should be provided in Appendix XI of the application.

   a. All hazardous waste management units regulated under the Industrial Solid Waste and Municipal Hazardous Waste Rules (Chapter 335) required to be monitored in accordance with 30 TAC 335.164 (Detection Monitoring), 335.165 (Compliance Monitoring Program) and 335.166 (Corrective Action Program);
   b. All solid waste management units (SWMUs) and Areas of Concern (AOCs) regulated under 335.167 which are recommended for further investigation and/or corrective action in the RCRA Facility Assessment (RFA) shall include those identified in accordance with the permit requirements subsequent to the initial RFA.
   c. All on site wastewater treatment units.

3. Facility History

   Based on the information provided in CP Table XI.A.1., complete CP Table I - Waste Management Units and Areas Subject to Groundwater Corrective Action

and Compliance Monitoring accordingly in the format provided.

For the SWMUs or AOCs listed in CP Table XI.A.1. regulated under 30 TAC 335.167 which are recommended for further investigation and/or corrective action in the RCRA Facility Assessment (RFA), including those identified in accordance with permit requirements subsequent to the initial RFA, complete CP Table II - Solid Waste Management Units and Areas of Concern for which Corrective Action applies pursuant to 30 TAC 335.167. CP Table II will become part of the Compliance Plan.

4. Site Geology, Hydrogeologic Conditions, and Relationship to Surface Water

For New, modified/amended Compliance Plan, please provide a Geology Report as required by Section VI.B of this application containing updated site geologic information including the following descriptions, maps and tables with appropriate supporting documentation [All maps should be at the scale of 1 inch equal to not more than 200 feet and legible when reduced to 8.5" by 11" letter size paper]:

a. A description of the site geology for the facility. The geologic description should include a site geology map and sufficient cross sections (see Item h. below) to describe the uppermost aquifer and any confining stratigraphic unit(s) beneath the site.

b. A description of the site soils and subsurface lithologies using the Unified Soil Classification System. For those soil units which do not extend beneath the entire site area, the soil description should include a plan view map designating the soil's areal extent;

c. Where a soil remedy is required in a corrective action program of Section XI.D.1. of this application for a Regulated Unit, SWMU and/or AOC, the applicant shall submit a description of contamination in soils of the vadose zone (unsaturated zone above the uppermost aquifer). The soil description should include maps indicating lateral and vertical extent of contamination;

d. A description and designation of the uppermost saturated zone or uppermost aquifer including the name, the type of unit (e.g. perched, confined, etc.,), and groundwater characteristics (flow rates, directions, hydraulic conductivity, etc.). As defined in 40 CFR 260.10, an aquifer is a geologic formation, group of formation, or part of a formation, capable of yielding significant amount of groundwater to wells or springs. Persons using Texas Risk Reduction Program (TRRP) should also consider the definition of a groundwater bearing unit as a saturated geologic formation, group of formations, or part of a formation with a hydraulic conductivity of equal to or greater than 1 x 10 -5 centimeters/second (30 TAC 350.4(a)40).

   Based on the information contained in the Geology Report, complete CP Table IX-Description of Uppermost Aquifer. CP Table IX will be come part of the Compliance Plan.

e. Present the geologic, stratigraphic and hydrogeological information; and

f. Maps indicating the lateral and vertical extent of the contamination for each stratigraphic unit affected, with supporting documentation.

g. Current Contaminant Plume Map(s) Locating and identifying the extent of

contamination as determined from previous monitoring on a separate facility base map(s). Locate and identify all monitor wells and waste management units/areas.

h. Cross section Cross section transect lines should be indicated on the Contaminant Plume Map. The applicant, at a minimum, must submit two (2) stratigraphic cross sections for each waste management unit/area. One cross section should be drawn through all the point of compliance wells and the second cross section should be drawn along the direction of the movement of the contaminant plume released from the unit/area. Cross sections should follow the requirements outlined in the Geologic and Hydrogeologic Report of Parts IV and V of this application. At a minimum, the cross sections should include the following information:

1. the stratigraphic interpretation (e.g., surface grade, uppermost aquifer, aquiclude);
2. lithology/geologic description of the uppermost aquifer and aquiclude;
3. the potentiometric surface;
4. detected non-aqueous phase liquids (NAPLs) and hazardous constituents; and
5. screen length and screen depth for each well in the cross section.

i. Well Construction diagram The report should include a well construction diagram for all wells used in the cross section. The well construction diagram should include the information in "Attachment B" of this (Compliance Plan) application. The well construction diagram information may be included on the geologic cross-section(s).

j. Describe the potential for any surface water bodies to be hydraulically connected to groundwater containing hazardous constituents. Apply the guidance provided in Determining PCLs for Surface Water and Sediment, RG-366/TRRP-24 Revised, December 2002, in order to determine the water body type and applicable surface water criteria for human health, aquatic life and wildlife, as applicable.

B. Hazardous Constituents In Groundwater And Groundwater Protection Standards (GWPSs)

Hazardous Constituents in Groundwater

For each contaminated hydrogeologic unit beneath a waste management unit/area (40 CFR 264.95), provide a list of all 40 CFR Part 264 Appendix IX hazardous constituents that have been detected in groundwater samples above background values, Practical Quantitation Limits (PQLs), or Method Quantitation Limits (MQLs). Please submit for each unit/area the most recent Appendix IX laboratory analysis results showing the constituents, constituent concentrations, methods used for analysis and associated laboratory QA/QC.

The groundwater samples (collected for the purpose of determining whether constituents listed in Appendix IX are present) shall be from each waste management unit/area monitoring well system as required by 30 Texas Administrative Code (TAC) 335.164 (detection monitoring program).

If the waste management unit/area is subject to Corrective Action Program required by 30 TAC 335.166 or 335.167 and/or Compliance Monitoring required by 30 TAC 335.165, then list the unit/area and include the list of hazardous constituents and their principal degradation constituents in:

CP Table III - Corrective Action Program Table of Detected Hazardous and Solid Waste Constituents and the Groundwater Protection Standard; and

CP Table IV - Compliance Monitoring Program Table of Hazardous and Solid Waste Constituents and Practical Quantitation Limits or Method Quantitation Limits for Compliance Monitoring.

1. Groundwater Protection Standards (GWPSs)
   The GWPS (30 TAC 335.158) is designed to ensure that hazardous constituents (30 TAC 335.159) identified in groundwater and their principal degradational constituents do not exceed concentrations that pose a present or potential hazard to human health and the environment. Compliance monitoring and corrective action programs for a Regulated Unit (30 TAC 335.165 and 335.166) and a corrective action program for a solid waste management unit (SWMU) (30 TAC 335.167) require human health and the environment to be protected from all releases of hazardous wastes and constituents. These corrective action and monitoring programs are evaluated using the GWPS. The GWPS is based on the following criteria.
   a. Background Levels Background levels authorized under 30 TAC 335.160(a)(1) are defined as constituent concentration values that are naturally occurring or are not influenced by contamination coming from the waste management unit. These values are established by statistical analysis of upgradient well sampling data. Analytical results from a sufficient number of independent samples are required to be utilized with an approved and appropriate statistical method. For guidance on the statistical methods consult, Statistical Analysis of Groundwater Data at RCRA Facilities-Unified Guidance, U.S. EPA, March 2009, and any subsequent updates to this document.
      Practical Quantitation Limits (PQLs) or Method Quantitation Limits (MQLs) are utilized in lieu of background values unless a background demonstration establishes concentrations for naturally occurring constituents. The PQL or MQL is defined in the footnote of CP Tables III and IV.
   b. Primary and Secondary Maximum Contaminant Levels (MCLs) Maximum permissible level of a contaminant in water which is delivered to any user of a public water system (40 CFR Part 141 and 143, Federal Safe Drinking Water Act).
   c. Alternate Concentration Limits (ACLs) determined in accordance with 30 TAC 335.160(b) and are defined in footnote of CP Tables III and IV.

2. Establishing the Groundwater Protection Standard (GWPS)
   a. If background, PQL or MQLs are proposed for the GWPS, the applicant must list all constituents (i.e., detected and degradational constituents) for which a GWPS is being applied for and the appropriate concentration limits. This information shall be submitted in the format of CP Tables III, and IV.
   b. Alternate Concentration Limits (ACLs) ACLs are established at the point of compliance (POC) for a regulated or solid waste management unit (SWMU). All concentration values or limits listed in Section XI.B.1.c. are considered ACLs. ACLs are evaluated in accordance with the provisions of 30 TAC 335.160(b) and other regulations acceptable to the executive director. If an ACL is requested on the basis of Section XI.B.1.c. (MCLs), then no ACL

demonstration is necessary. The ACL demonstration must establish constituent concentrations in groundwater in accordance with regulations acceptable to the executive director. This information shall be submitted in the format of CP Tables III and IV. Note that depending upon the rule employed [i.e., 30 TAC 335 Subchapter S - Risk Reduction Rules (RRR) or 30 TAC 350 - Texas Risk Reduction Program (TRRP)], the applicant should determine the GWPS for the point of compliance and point of exposure, as applicable, in accordance with the remedy standard being utilized.

c. If the contaminant plume discharges or has a potential to discharge into surface water, then the facility must also comply with 30 TAC Chapter 307 (Texas Surface Water Quality Standards) unless other regulatory requirements acceptable to the executive director are requested.

C. Compliance Monitoring Program

As required by 30 TAC 335.165, an owner or operator must monitor the groundwater to determine whether Regulated Units are in compliance with the Groundwater Protection Standard (GWPS) under 30 TAC 335.158. The applicant must provide the following information when proposing a compliance monitoring program.

1. Groundwater Monitoring Program Description

a. Describe the proposed groundwater monitoring system to be used to monitor compliance with the GWPS which includes the following information.

(1) Changes, if applicable, from the current detection monitoring system or compliance monitoring system groundwater monitoring program at the waste management unit that will be required to comply with the compliance monitoring program described in 30 TAC 335.165. This description should address changes concerning:

(a) Geological and/or hydrogeological information differences since the submittal of the previous application [must submit an updated Geologic and Hydrogeologic Report required by Section XI.A.4];
(b) Waste management areas/units;
(c) Construction details for monitor wells to evaluate compliance with "Attachment B" well specification requirements;
(d) The number and locations of additional monitor wells [also see Section XI.C.1.b.(2)];
(e) Sample handling, chain of custody, and analytical procedures (also see "Attachment C");
(f) Frequency of monitoring;
(g) Monitoring parameters;
(h) Evaluation of compliance with GWPS (Statistical Methods);
(i) Other Sampling and Analysis Plan information to be compliant with "Attachment C";
(j) Compliance period as defined in Section XI.E.1.c. of the application;
(k) Financial assurance (see Section XI.E.); and
(l) An ACL variance under 30 TAC 335.160(b), if applicable.

(2) The number, depth and location of all monitor wells (Background Wells, Point of Compliance Wells, Observation Wells, Piezometers,

etc.). Complete CP Table V - Designation of Wells by Function and make changes as applicable to plans referenced in Section XI.C.1.b.

(3) The proposed hazardous constituent monitoring list which is based on constituents that were monitored during detection monitoring (if applicable), constituents detected in accordance with 30 TAC 335.164, and degradational constituents identified in Table CP IV accordingly to develop the constituent list for the Compliance Monitoring Program. Also, list the PQL, MQL, or background concentration for each constituent in CP Table IV. CP Table IV shall become part of the final Compliance Plan to be analyzed at least annually as required by 30 TAC 335.165(7).

(4) The proposed indicator parameter monitoring list. From the list of constituents and GWPS identified in CP Table IV., complete CP Table IVA - Compliance Monitoring Program, Table of Detected Hazardous Constituents and the Groundwater Protection Standard for Compliance Monitoring, accordingly. CP Table IVA shall become part of the final Compliance Plan to be analyzed at least semiannually as required by 30 TAC 335.165(6).

(5) Frequency of monitoring should be specified in CP Table VIII

(6) Provisions for reporting groundwater data at least on an annual basis should be specified in CP Table VII).

(7) Annual determination of contamination plume rate and direction of migration.

(8) Compliance period. Calculate the compliance period as required by 30 TAC 335.162 and 335.165(1)(d). Include calculations and complete CP Table VI - Compliance Period for RCRA-Regulated Units which shall become part of the final Compliance Plan.

b. Submit the following plans and reports.

(1) Current Sampling and Analysis Plan The Sampling and Analysis Plan must include information required by 30 TAC 335.163(4) and 335.163(5) and 40 CFR Subpart 270.30(j). For guidance, please see "Attachment C" to the application.

(2) Monitoring System Plan If the applicant is proposing a monitoring well or a monitoring system in the application, the applicable well installation specifications outlined in "Attachment B" of this application should be followed. All new monitoring wells must be installed in accordance with the specifications outlined in "Attachment B", unless an alternative design is approved by the agency prior to installation. If the applicant proposes as part of the monitoring system, any well (existing or proposed) that does not meet or exceed the requirements outlined in "Attachment B", then the proposed alternative design must be described in detail in the Monitoring System Plan and must be submitted with this application. The Monitoring System Plan must include:

(a) Monitoring System Design and Specifications Certified by a qualified engineer and/or geologist which provides detailed plans and specifications on the monitoring system design; and

(b) Well Drilling and Well Casing Specifications Certified by a qualified engineer and/or geologist which provides details on well casing specification, drilling logs and reports.

(3) Current Geologic and Hydrogeologic Report Provide a report per Section X.I.A.4 of this application discussing the geologic and hydrogeologic conditions of the facility and the specific area affected by the waste management areas. This report should include the most up-to-date information from which the design of the groundwater monitoring system was based.

2. Waste Management Units Monitored

a. Delineate and identify the following for each waste management unit in the proposed groundwater monitoring program.

(1) Boundary of the waste management unit and, if applicable, the proposed waste management area which includes more than one waste management unit (identify all waste management units which are included in the waste management area). These waste management units subject to compliance monitoring should be listed in CP Table I - Waste Management Units and Areas Subject to Groundwater Corrective Action and Compliance Monitoring which shall become part of the final Compliance Plan.

(2) The proposed point of compliance (30 TAC 335.161) and point of exposure wells.

(3) Any other proposed monitor wells such as supplemental wells, observation wells, background wells, etc. If appropriate the groundwater monitoring system should have a sufficient number of wells be designated to monitor the downgradient extent of the plume.

(4) Features which may serve as conduits for subsurface contamination.

b. For each waste management unit/area in the proposed groundwater monitoring system, submit the locations of individual waste management unit/area monitor wells (existing or proposed) and any soil borings (plugged and unplugged) specifically drilled for assessment of contamination. These individual monitor wells shall be identified by respective well number on a plan view drawing and only the background, point of compliance and/or point of exposure wells should be indicated in CP Table V - Designation of Wells by Function. The plan view map depicting the location of individual monitoring wells for compliance monitoring should be labeled as "CP Attachment A, sheet xx of xx" in the text box. The title box should also include reference to the facility name, Permit/Compliance Plan Number, Solid Waste Registration Number, Unit Description or name with Notice of Registration (NoR) Unit No. 0000. The "CP Attachment A" map(s) and CP Table V shall also become part of the final Compliance Plan.

3. Implementation Schedule

Itemize and discuss, in detail, the estimated time schedule necessary for any testing and assessments, system design, construction and installation, and final implementation of the groundwater monitoring program for each Regulated

Unit and solid waste management unit. If the schedule of implementation for items are not completed at the time of the application or are not completed at the time of issuance of the final draft Permit/Compliance Plan, then the items should be added to the CP Table VIII - Compliance Schedule of the application.

D. Corrective Action Program

As required by 30 TAC 335.166, the owner or operator must take corrective action to ensure that Regulated Units are in compliance with the Groundwater Protection Standards (GWPS) under 30 TAC 335.158. As required under 30 TAC 335.167, all releases of hazardous constituents from any solid waste management unit at the facility must also be addressed. For existing corrective action programs which have been approved by the TCEQ, the applicant shall provide a copy of the TCEQ corrective action system approval letter, design system specifications and any updates as requested in Section XI.D.3.a.(1) of this section. The applicant must provide the information requested below when proposing a corrective action program which has not been previously approved by the TCEQ including a detailed description of a corrective action or a combination of corrective actions that will remedy the groundwater contamination at the waste management unit and a proposed plan for a monitoring program that will demonstrate the effectiveness of the corrective action.

The owner or operator may also apply for a the Facility Operations Area (FOA) pursuant to the requirements of 30 TAC 350.131 - 350.135 of the Texas Risk Reduction Program (TRRP) rules, provided the applicant meets the FOA pre-approval process steps 1 through 3 approved by the Commission.

Also, the owner or operator may apply for alternative groundwater Corrective Action Program pursuant 30 TAC 335.151, 335.156 and 30 TAC 350, where there are commingled releases from RCRA-regulated unit from one or more SWMUs, PCO, and/or AOC.

1. Type of Corrective Action Proposed
From the list below, indicate the type of groundwater corrective action proposed for each hazardous waste unit/area. Discuss in detail if more than one corrective action is to be used in a waste management area. Submit the discussion and descriptions as an attachment to the application.
    a. Groundwater well recovery with surface treatment
    b. Groundwater well recovery/surface treatment/re injection
    c. Groundwater well recovery and disposal
    d. Vapor extraction system
    e. Interceptor trench recovery and disposal
    f. Interceptor trench recovery and surface treatment
    g. In-situ treatment - bioreclamation
    h. In-situ treatment - chemical reaction
    i. Barrier walls/encapsulation
    j. Permeable treatment beds
    k. Other, please describe

2. Program Description

Attach a technical report providing a detailed description of a complete corrective action system including above and below ground equipment/ facilities. Include discussions on the following concerns for each type of corrective action as applicable.

a. Recovery Wells

(1) Indicate on a plan view of the waste management area the anticipated location of Recovery Well(s) which would optimize the extraction of the groundwater contaminants.
(2) Indicate on a plan view the estimated radius of influence of each Recovery Well.
(3) Indicate the optimum pumping rate of each Recovery Well determined from the aquifer pump test.
(4) Describe the design of the Recovery Wells and pump system including diameter, construction material, gravel packing, screen slot sizes and patterns, type of pumps and maintenance requirements.
(5) Describe the collection and storage of the contaminated groundwater which is classified hazardous waste (on site storage of hazardous waste shall require compliance with the applicable regulations):
    (a) Less than 90-day tanks (see 40 CFR 262.34/40 CFR 265 Subpart J);
    (b) Permitted Tanks (see 40 CFR 264 Subpart J);
    (c) (Less than 90-day Container Storage Area (see 40 CFR 262.34/40 CFR 265 Subpart I);
    (d) Permitted Container Storage Area (see 40 CFR 264 Subpart I); and
    (e) Temporary Units (see CFR 264.553).
(6) Describe the treatment and/or final disposition of the hazardous and nonhazardous contaminated groundwater.

b. Vapor Extraction System
(1) Indicate on a plan view of the waste management area the anticipated location of the vapor extraction system which would optimize the extraction of hazardous constituents from the vadose zone.
(2) Describe the construction design of the vapor extraction system in detail, including all diagrams and drawings.
(3) Describe the emission control equipment used to comply with air quality regulations.
(4) Provide the anticipated volatile contaminants to be remediated along with information on the expected effectiveness of the vapor extraction system at the waste management unit.
(5) Provide established treatability data for the proposed design.
(6) Specify the hazardous constituents affected by this type of treatment.

c. Interceptor Trenches
(1) Indicate on a plan view of the waste management area the anticipated location of the interceptor trench.
(2) Provide the construction design.
(3) Describe the procedure for construction.
(4) Describe the liquid removal and collection system.
(5) Describe the surface storage and/or treatment of the contaminated groundwater.
(6) Describe the final disposition of the contaminated groundwater.

d. In-situ Treatment - Chemical Reaction
   (1) Characterize the chemical agents to treat the contaminated groundwater and/or soils in the vadose zone.
   (2) Provide laboratory treatability data.
   (3) Specify the hazardous constituents affected by this type of treatment.
   (4) Specify the reaction by products produced during the chemical reactions.
   (5) Indicate degradation time for each treated hazardous constituent and any resulting chemical reaction by products.
   (6) Describe the potential health risks caused by human exposure to the reaction by products.
   (7) Describe potential damage to wildlife, crops, vegetation and physical structures caused by exposure to reaction by products.
   (8) Describe the persistence and permanence of the potential effects of the reaction by products.
   (9) Describe the method of chemical reactant injection and other important aspects of the system design.

e. In-situ Treatment Bioreclamation
   (1) Describe the type of bacteria most appropriate for the degradation of the hazardous constituents present in the groundwater and/or soil in the vadose zone.
   (2) Describe the nutrients necessary and application frequency to encourage effective bioreclamation.
   (3) Provide laboratory data from treatability studies utilizing the contaminated groundwater and describe any potential hazardous by products.
   (4) Indicate the degradation time for each hazardous constituent affected by this treatment.
   (5) Describe the method of injecting the bacteria and nutrients and describe the delivery system design.

f. Barrier Walls
   (1) Provide laboratory permeability data using the actual contaminated groundwater.
   (2) Describe the barrier wall materials.
   (3) Summarize construction design and installation procedures.

g. Permeable Treatment Beds
   (1) Provide laboratory data of treatability simulations using actual contaminated groundwater in combination with the material proposed to be used in treatment beds.
   (2) Discuss the properties of the treatment material which would make it effective for use at this site.
   (3) Indicate which hazardous constituents will be affected by this treatment. Indicate the reactions which will take place and the resulting reactant by products. Discuss the anticipated lifetime of the permeable treatment beds.
   (4) Provide the construction design and installation procedures.

h. Other

Discuss in detail, any other corrective action (soils and groundwater) not

included above which is proposed for use at the affected waste management area(s).

3. Groundwater Monitoring and Corrective Action Program Description

a. Describe the proposed groundwater monitoring system to be used to monitor corrective action and compliance with the GWPS which includes the following information.

(1) Changes, if applicable, from the current groundwater monitoring program at the waste management unit that will be required to comply with the corrective action monitoring program described in 30 TAC 335.166. This description should address changes concerning:

(a) Geological and/or hydrogeological information differences since the submittal of the previous application [must submit a Geologic and Hydrogeologic Report in accordance with Section XI.A.4;

(b) Waste management areas/units;

(c) Construction details for monitor wells to evaluate compliance with "Attachment B" well specification requirements;

(d) The number and locations of additional monitor wells [must submit the Monitoring System Plan/Report required by Section XI.D.3.c.(2);

(e) Sample handling, chain of custody, and analytical procedures (also see "Attachment C");

(f) Frequency of monitoring;

(g) Monitoring parameters;

(h) Evaluation of compliance with GWPS (statistical methods);

(i) Other Sampling and Analysis Plan information to be incompliant with "Attachment C";

(j) Compliance period as defined in Section XI.E.1.c. of the application;

(k) Financial assurance; and

(l) An ACL variance under 30 TAC 335.160(b), if applicable.

(2) The number, depth and location of all monitor wells (Background Wells, Point of Compliance Wells, Corrective Action Observation Wells, Supplemental Wells, piezometers, etc.) and all Recovery Wells and complete CP Table V - Designation of Wells by Function. Also, make revisions as applicable to plans referenced in Section XI.D.3.c.

(3) The proposed hazardous constituent monitoring list which is based on constituents that were monitored during detection monitoring (if applicable), constituents detected in accordance with 30 TAC 335.164, and degradational constituents identified in CP Table III accordingly to develop the constituent list for the Corrective Action Monitoring Program. CP Table III shall become part of the final Compliance Plan.

(4) The proposed indicator parameter monitoring list. From the list of constituents and GWPS identified in CP Table III complete CP Table IIIA - Corrective Action Program Table of Indicator Parameters and the Groundwater Protection Standard,

accordingly. CP Table IIIA shall become part of the Compliance Plan to be analyzed at least semiannually as required by 30 TAC 335.166(7).

(5) Frequency of monitoring should be specified in CP Table VIII

(6) Provisions for reporting groundwater data at least on an annual basis should be specified in CP Table VII)

(7) Annual determination of contamination plume rate and direction of migration.

(8) Compliance period. Calculate the compliance period as required by 30 TAC 335.162 and 335.165(1)(d). Include calculations and complete CP Table VI - Compliance Period for RCRA-Regulated Units which shall become part of the final Compliance Plan

b. Proposed methods of evaluating the effectiveness of the corrective action in the saturated and vadose zone.

c. Submit the following plans and reports.

(1) Current Sampling and Analysis Plan The Sampling and Analysis Plan must include information required by 30 TAC 335.163(4) and 335.163(5) and 40 CFR Subpart 270.30(j). For guidance, please see "Attachment C" to the application.

(2) Groundwater Recovery and Monitoring System Plan At a minimum, the plan must include:

(a) Recovery System Plan The applicant should propose a recovery system design that will achieve the performance requirement to protect human health and the environment. The plan should provide detailed plans, information and specifications on the recovery system's design and well installation specifications. All new recovery wells must be installed in accordance with applicable specifications outlined in "Attachment B", unless an alternative well design is approved by the agency prior to installation of the well. The Recovery System Plan must include Recovery System Design and Specifications Certified by a Texas Registered Professional Engineer. The certification must be sealed by a licensed Professional Engineer, with current license, along with the Registered Engineering Firm's name and Registration Number as required by the Texas Engineering Practice Act.;

(b) Monitoring System Plan If the applicant is proposing a monitoring well or a monitoring system in the application, the applicable well installation specifications outlined in "Attachment B" of this application should be followed. All new monitoring wells must be installed in accordance with the specifications outlined in "Attachment B", unless an alternative design is approved by the agency prior to installation. If the applicant proposes as part of the monitoring system, any well (existing or proposed) that does not meet or exceed the requirements outlined in "Attachment B", then the proposed alternative design must be described in detail in the Monitoring System Plan and must be submitted with this application. The

Monitoring System Plan must include:

(i.) Monitoring System Design and Specifications Certified by a qualified engineer and/or geologist which provides detailed plans and specifications on the monitoring system design; and

(ii.) Well Drilling and Well Casing Specifications Certified by a qualified engineer and/or geologist which provides details on well casing specification, drilling logs and reports.

(3) Current Geologic and Hydrogeologic Report - Provide a report per Section XI.A.4 of this application discussing the geologic and hydrogeologic conditions of the facility and the specific area affected by the waste management areas. This report should include the most up-to-date information from which the design of the groundwater monitoring system was based.

4. Waste Management Units/Areas Monitored Under Corrective Action Programs

a. Delineate and identify the following for each waste management unit/area in the proposed groundwater monitoring and corrective action programs.

(1) Boundary of the waste management unit and, if applicable, the proposed waste management area which includes more than one waste management unit (identify all waste management units which are included in the waste management area). These waste management units/areas subject to corrective action pursuant to 30 TAC 335.166 and 335.167 should be listed in CP Table I - Waste Management Units and Areas Subject to Groundwater Corrective Action and Compliance Monitoring. CP Table I shall become part of the final Compliance Plan.

(2) The proposed point of compliance (30 TAC 335.161), point of exposure wells, or alternate point of exposure wells.

(3) Any proposed monitor wells such as supplemental wells, observation wells, background wells, etc. If appropriate the groundwater monitoring system should have a sufficient number of wells to monitor the downgradient extent of the plume.

(4) Features which may serve as conduits for subsurface contamination.

(5) Corrective action system.

b. For each waste management unit/area in the proposed groundwater monitoring system, submit the locations of individual waste management unit/area monitor wells (existing or proposed) and any soil borings (plugged and unplugged) specifically drilled for assessment of contamination. These individual monitor wells shall be identified by respective well number on a plan view drawing and only the background, point of compliance, point of exposure wells and/or alternate point of exposure wells should be indicated in CP Table V - Designation of Wells by Function. The plan view map depicting the location of individual monitoring wells for corrective action monitoring should be labeled as "CP Attachment A, sheet xx of xx" in the text box. The title box should also include reference to the facility name, Permit/Compliance Plan Number, Solid Waste Registration Number, Unit

Description or name with Notice of Registration (NoR) Unit No. 0000. The "CP Attachment A" map(s) and CP Table V shall also become part of the final Permit/Compliance Plan.

5. Waste Management Units/Areas Addressed Under Other Corrective Action Programs -Facility Operations Area (FOA), specific to the requirements of 30 TAC 350.131 - 350.135. The Permittee should also complete Sections XI.D.4. for other units not addressed by the FOA that may require corrective action outside the FOA boundary. For other units not addressed by the FOA, either within the FOA or outside the FOA which may require compliance monitoring, the Permittee should complete Section XI.C. of this application accordingly.

   a. Provide an approved version of the FOA Qualifying Criteria Checklist and evidence that Steps 1 through 3 of the FOA pre-approval process has been approved by the Commission.

   b. Provide a discussion on exceptions to the TRRP rule requested.

   c. Provide a summary of the SWMUs/AOCs that will be addressed within the FOA boundary and a discussion of the multiple sources of COCs present and how FOA will better address these sources.

   d. Provide maps of appropriate scale depicting the following (maps may be combined where appropriate):

      (1) The number, location and type of monitoring points in each stratigraphic unit to be monitored individual monitoring wells should be identified by respective well number on a plan view drawing, to include the background, Point of Compliance (POC), Point of Exposure (POE), FOA Boundary of Compliance wells, FOA piezometers or supplemental wells, Corrective Action Observation ((CAO), Corrective Action System (CAS) wells that are applicable for FOA monitoring program should be labeled as "CP Attachment A, sheet no xx of xx" in the title box. The title box should also include reference to the facility name, Permit/ Compliance Plan Number (00000), TCEQ Solid Waste Registration Number and Unit Description or Name. The "CP Attachment A" map(s) shall become part of the final Permit/Compliance Plan.
      (2) HWMUs/SWMUs/AOCs addressed
      (3) Surrounding land use
      (4) FOA lateral boundaries
      (5) Potential source areas
      (6) Potentiometric surface of all relevant transmissive units
      (7) Surrounding water wells
      (8) Extent of known contamination in each transmissive unit
      (9) Areas of potential ecological impact
      (10) Known occurrences of NAPL or DNAPL in each transmissive units
      (11) FOA access control components

   e. Provide cross-sections in accordance with Section XI.A.4. depicting the following (maps may be combined where appropriate);

      (1) The vertical boundaries of the FOA;
      (2) The vertical extent of contamination;
      (3) Groundwater level elevations for each transmissive unit.

f. Provide tabulated information for;
   (1) Results of Appendix IX GW sampling.
   (2) Proposed PCLs for each hazardous constituent and principal degradational constituent for each monitoring point with supporting documentation (including a discussion of exposure pathways) should be listed in CP Table III - CORRECTIVE ACTION PROGRAM Table of Detected Hazardous and Solid Waste Constituents and the Groundwater Protection Standard. CP Table III shall become part of the final Compliance Plan.
   (3) The proposed indicator parameter monitoring list. From the list of constituents and GWPS identified in CP Table IIIA. CP Table IIIA shall become part of the Compliance Plan to be analyzed at least semiannually as required by 30 TAC 335.166(7).
   (4) Only the background, POC, POE, FOA Boundary of Compliance wells should be listed in CP Table V which shall become part of the final Permit/Compliance Plan.

g. Provide a discussion of the types of corrective action that will be employed to address contaminated media.
h. Provide detailed descriptions of GW recovery and other remedial technologies such as vapor extraction, interceptor trenches, hydraulic containment, barrier walls, etc., including radius of influence, estimated optimum recovery rates, location of collection, storage or disposal facilities.
i. Provide a detailed description of the ground water monitoring system including placement of monitoring wells, hydrogeologic characteristics of monitored units and well completion details.
j. Provide a Sampling and Analysis plan for the proposed FOA that includes development of COCs to be monitored, sampling methodology, sample handling procedures, sampling frequency and statistical procedures for evaluating analytical results (Appendix C).
k. Propose a methodology for evaluating the effectiveness of remedial measures and potential remedial system enhancements.
l. Propose a reporting schedule to provide updated information on the installation and operation of remedial and monitoring systems.
m. Provide Financial Assurance in accordance with Section XI.E.
n. Provide draft language intended to comply with the deed notification requirements of 30 TAC 350.111 and 350.135(a)(11).
o. Provide a summary of the approved workers protection plan.
p. Provide a discussion of areas of ecological impact, if any, and development of associated Protective Concentration Limits (PCLs).
q. Provide a discussion of how NAPL occurrences, if any, will be addressed inside and outside the FOA.
r. Provide a schedule of implementation for items not completed at the time of application See also Section XI.D.8.

6. Waste Management Units/Areas Monitored Under Corrective Action Programs - Plume Management Zone (PMZ)
   a. Please provide a summary of the HWMUs and SWMUs/AOCs that will be addressed within the PMZ boundary.
   b. Please provide a discussion of the multiple sources of COCs present and how PMZ will better address these sources.
   c. Please provide maps of appropriate scale depicting the following (maps may be combined where appropriate);
      (1) HWMUs/SWMUs/AOCs addressed

(2) surrounding land use
(3) PMZ lateral boundaries
(4) potential source areas
(5) Potentiometric surface of all relevant transmissive units
(6) Surrounding water wells
(7) extent of known contamination in each transmissive unit
(8) number, location and type of monitoring points in each stratigraphic unit to be monitored
(9) Areas of potential ecological impact
(10) known occurrences of LNAPL or DNAPL in each transmissive unit

d. Please provide sufficient cross-sections depicting the following (maps may be combined where appropriate);
   (1) The vertical boundaries of the PMZ;
   (2) The vertical extent of contamination;
   (3) potentiometric surfaces for each transmissive unit.

e. Please provide tabulated information for;
   (1) history of all relevant units or AOCs;
   (2) summary of hydrogeologic data for each affected transmissive unit;
   (3) results of Appendix IX GW sampling;
   (4) proposed PCLs for each constituent for each monitoring point (Point of Exposure wells, alternate point of exposure wells, etc.) with supporting documentation (including a discussion of exposure pathways). This should also include the designation/ establishment of sufficient number of Attenuation Monitoring Points (AMPs) beginning at an appropriate hydraulically upgradient location within the groundwater protective concentration level exceedance (PLCE) zone and continuing down the approximate central flow path of the constituent of concern (COC) in the downgradient extent of the Plume Management Zone(s) in accordance with 30 TAC 350.33(f)(4)(D).
   (5) Establish/Calculate Attenuation Action Levels (AALs) (critical PCLs) for each attenuation monitoring point in accordance with 30 TAC 350.33(f)(4)(D)(ii). The established AALs (critical PCLs) for each AMP well should be graphically presented in table format on the plan view map depicting the location of individual monitoring wells (including AMP wells) for corrective action monitoring labeled "CP Attachment A, Sheet xx of xx", referenced in XI.D.4.b.

f. Please provide a discussion of the types of corrective action that will be employed to address contaminated media.
g. Please provide detailed descriptions of GW recovery and other remedial technologies such as vapor extraction, interceptor trenches, hydraulic containment, barrier walls, etc., including radius of influence, estimated optimum recovery rates, location of collection, storage or disposal facilities.
h. Please provide a detailed description of the groundwater monitoring system including placement of monitoring wells, hydrogeologic characteristics of monitored units and well completion details.
i. Please provide a Sampling and Analysis plan for the proposed PMZ that includes development of COCs to be monitored, sampling methodology, sample handling procedures, sampling frequency and statistical procedures

for evaluating analytical results.

j. Please propose a methodology for evaluating the effectiveness of remedial measures and potential remedial system enhancements.
k. Please propose a reporting schedule to provide updated information on the installation and operation of remedial and monitoring systems.
l. Please provide a thorough detailed description of an estimate of all costs that will be incurred by implementing, operating, and maintaining the corrective action and monitoring systems addressed by the compliance plan.
m. Please provide draft language intended to comply with the deed notification requirements of 350.111, and schedule to verify compliance with institutional control requirements in accordance with 30 TAC 350.31(g) which provides notice of the existence and location of the PMZ and which prevents exposure to groundwater from this zone until such a time as constituents of concern may be reduced to below the GWPS.
n. Schedule for notification requirements if an unexpected event occurs, or a condition is detected, during post-response action care period which indicates that additional response actions will be required at an affected property pursuant to 30 TAC 350.33(k).
o. Please provide a summary of the approved soil response action plan.
p. Please provide a discussion of areas of ecological impact, if any, and development of associated PCLs.
q. Please provide a discussion of how NAPL occurrences, if any, will be addressed inside the PMZ.
r. Please provide a schedule of implementation for items not completed at the time of application {See also Section XI.D.8.}

7. Waste Management Units/Areas Monitored Under Alternative Corrective Action Program for Co-mingled plumes Alternative groundwater Corrective Action Program apply, pursuant 30 TAC 335.151, 335.156 and 350, for commingled release from RCRA-regulated unit and from one or more SWMUs and/or AOC.

a. Complete Sections XI.D.1. through 4.;
b. In addition to the CP Attachment A maps in Section XI.D.4.b., CP Attachment A maps should clearly depict those waste management unit or areas of the facility which have commingled plumes and the alternative corrective action applies.
c. Please provide a schedule of implementation for items not completed at the time of application {See also Section XI.D.8.}

8. Implementation Schedule
Itemize and discuss, in detail, the estimated time schedule necessary for any testing and assessments, system design, construction and installation, and final implementation of the groundwater monitoring program for each Regulated Unit and solid waste management unit. If the schedule of implementation for items are not completed at the time of the application or are not completed at the time of issuance of the final draft Compliance Plan, then the items should be added to the CP Table VIII - (Compliance Schedule) of the application.

E. Cost Estimates For Financial Assurance

As required by 30 TAC 335.156 and 335.167, the applicant must provide cost estimates for groundwater monitoring and corrective action to determine the amount of financial assurance. Please complete the applicable parts of this form. Cost estimates should be filled out for each proposed corrective action/monitoring system at the site; or any additional corrective action system not covered in this Part. Please note, the Executive

Director may request from the applicant documentary evidence for cost estimates.

If an item is not applicable, please mark it NA. Please Complete the following tables, as applicable:

1. CP Table XI.E. - General Infomation
2. CP Table XI.E.1. - Corrective Action Program Cost Estimate
3. CP Table XI.E.2.e - Groundwater Monitoring Cost Estimate
4. CP Table XI.E.3. - Financial Assurance Summary

Attachment A

Alternate Concentration Limits

Alternate Concentration Limits (ACLs) must be submitted by hazardous waste facility owners or operators who seek ACLs for any hazardous constituent as provided by 30 TAC 335.160(b) as a part of a compliance monitoring or corrective action program. An ACL demonstration should follow the guidance provided in this attachment. Compliance Plan Application, Section XI.B.2.b. outlines when an ACL demonstration must be conducted. Where possible in "Attachment A", the applicant may copy information previously submitted to the Commission and reference the information submitted in other Sections (Sections I and XI.B. through E.) of this Compliance Plan Application.

Alternate Concentration Limit Demonstration

An ACL petition is based on a demonstration that hazardous constituents detected in the groundwater will not pose a substantial present or future threat to human health or the environment at the ACL levels. Potential adverse effects on both groundwater quality and hydraulically connected surface water quality must be addressed. Using Environmental Protection Agency published lists of 40 CFR Part 264 Appendix IX hazardous constituents, the applicant must submit a list of all contaminants in the groundwater. For all the petitioned ACL constituents, the applicant must address all known synergistic and additive effects on human health and the environment to develop appropriate ACL levels.

Required Information for Alternate Concentration Limits

In addition to rule specific requirements (i.e., 30 TAC Chapter 335 Subchapter S RRR, or 30 TAC Chapter 350 TRRP), the following items must be addressed for each hazardous constituent for which an alternate concentration is sought (CP Tables III and IV, XII.B.). If the information required in this part has been furnished in other parts of Compliance Plan Application, please provide an adequate reference.

1. Potential adverse effects on groundwater quality, considering:
    a. The physical and chemical characteristics of the waste in the Regulated Unit, Solid Waste Management Unit(SWMU) or Area of Concern (AOC), including its potential for migration;
    b. The hydrogeological characteristics of the facility and surrounding land;
    c. The quantity of groundwater r and the direction of groundwater flow;
    d. The proximity and withdrawal rates of groundwater users;
    e. The current and future uses of groundwater in the area;
    f. The existing quality of groundwater, including other sources of contamination and their cumulative impact on the groundwater quality;
    g. The potential for health risks caused by human exposure to waste constituents;
    h. The potential damage to wildlife, crops, vegetation, and physical structures caused by exposure to waste constituents; and,
    i. The persistence and permanence of the potentially adverse effects.

2. Potentially adverse effects on hydraulically connected surface water quality, considering:
    a. The volume and physical and chemical characteristics of the waste in the Regulated Unit, Solid Waste Management Unit (SWMU) or Area of Concern (AOC);

b. The hydrogeological characteristics of the facility and surrounding land;
c. The quantity and quality of groundwater, and the direction of groundwater flow;
d. The patterns of rainfall in the region;
e. The proximity of the Regulated Unit to surface waters;
f. The current and future uses of surface waters in the area and any water quality standards established for those surface waters;
g. The existing quality of surface water, including other sources of contamination and the cumulative impact on surface water quality;
h. The potential for health risks caused by human exposure to waste constituents;
i. The potential damage to wildlife, crops, vegetation, and physical structures caused by exposure to waste constituents; and,
j. The persistence and permanence of the potentially adverse effects.

Attachment B

Well Design And Construction Specifications

The following well design and construction specifications should be used as guidance when designing a groundwater Compliance Monitoring Program (Section XI.C.) or a Corrective Action Program (Section XI.D.). This guidance is provided to establish minimum well design and construction specifications for the Compliance Plan.

1. Well drilling methods that minimize potential adverse effects on the quality of water samples withdrawn from the well and that minimize or eliminate the introduction of foreign fluids into the borehole must be utilized.

2. All wells shall be constructed such that the wells can be routinely sampled with a pump, bailer, or alternate sampling device. Piping associated with recovery wells should be fitted with sample ports or an acceptable alternative sampling method to facilitate sampling of the recovered groundwater on a well by well basis.

3. Above the saturated zone the well casing may be two (2) inch diameter or larger schedule 40 or 80 polyvinyl chloride (PVC) rigid pipe or stainless steel or polytetrafluoroethylene (PTFE or "teflon") or an approved alternate material. The PVC casing must bear the National Sanitation Foundation logo for potable water applications (NSF pw). Solvent cementing compounds shall not be used to bond joints and all connections shall be flush threaded. In and below the saturated zone, the well casing shall be stainless steel or PTFE.

   PVC or fiberglass reinforced resin may be used as an alternate well casing material in and below the saturated zone provided that it yields samples for groundwateruality analysis that are unaffected by the well casing material.

4. Any well that has deteriorated due to incompatibility of the casing material with the groundwater contaminants or due to any other factors must be replaced.

5. Well casings and screens shall be steam cleaned prior to installation to remove all oils, greases, and waxes. Well casings and screens made of fluorocarbon resins shall be cleaned by detergent washing.

6. Screen length shall not exceed ten (10) feet within a given transmissive zone unless otherwise approved by the executive director. Screen lengths exceeding ten (10) feet may be installed in groundwater recovery or injection wells to optimize the groundwater remediation process in accordance with standard engineering practice.

7. The intake portion of a well shall be designed and constructed so as to allow sufficient water flow into the well for sampling purposes and minimize the passage of formation materials into the well during pumping. The intake portion of a well shall consist of commercially manufactured stainless steel or PTFE screen or approved alternate material. The annular space between the screen and the borehole shall be filled with clean siliceous granular material (i.e., filter pack) that has a proper size gradation to provide mechanical retention of the formation sand and silt. The well screen slot size shall be compatible

with the filter pack size as determined by sieve analysis data. The filter pack should extend no more than three (3) feet above the well screen. A silt trap, no greater than one (1) foot in length, may be added to the bottom of the well screen to collect any silt that may enter the well. The bottom of the well casing shall be capped with PTFE or stainless steel or approved alternate material.

Groundwater recovery and injection wells shall be designed in accordance with standard engineering practice to ensure adequate well production and accommodate ancillary equipment. Silt traps exceeding one (1) foot may be utilized to accommodate ancillary equipment. Well heads shall be fitted with mechanical wellseals, or equivalent, to prevent entry of surface water or debris.

8. A minimum of two (2) feet of pellet or granular bentonite shall immediately overlie the filter pack in the annular space between the well casing and borehole. Where the saturated zone extends above the filter pack, pellet or granular bentonite shall be used to seal the annulus. The bentonite shall be allowed to settle and hydrate for a sufficient amount of time prior to placement of grout in the annular space. Above the minimum two (2) foot thick bentonite seal, the annular space shall be sealed with a cement/bentonite grout mixture. The grout shall be placed in the annular space by means of a tremie pipe or pressure grouting methods equivalent to tremie grouting standards.

   The cement/bentonite grout mixture or TCEQ approved alternative grout mixture shall fill the annular space to within two (2) feet of the surface. A suitable amount of time shall be allowed for settling to occur. The annular space shall be sealed with concrete, blending into a cement apron at the surface that extends at least two (2) feet from the outer edge of the monitor well for above ground completions. Alternative annular space seal material may be proposed with justification and must be approved by the executive director prior to installation.

   In cases where flush to ground completions are unavoidable, a protective structure such as a utility vault or meter box should be installed around the well casing and the concrete pad design should prevent infiltration of water into the vault. In addition, the following requirements must also be met 1) the well/cap juncture is watertight; 2) the bond between the cement surface seal and the protective structure is watertight; and 3) the protective structure with a steel lid or manhole cover has a rubber seal or gasket.

9. Water added as a drilling fluid to a well shall contain no bacteriological or chemical constituents that could interfere with the formation or with the chemical constituents being monitored. For groundwater recovery and injection wells, drilling fluids containing freshwater and treatment agents may be utilized in accordance with standard engineering practice to facilitate proper well installation. In these cases, the water and agents added should be chemically analyzed to evaluate their potential impact on in-situ water quality and to assess the potential for formation damage. All such additives shall be removed to the extent practicable during well development.

10. Upon completion of installation of a well, the well must be developed to remove any fluids used during well drilling and to remove fines from the formation to provide a particulate free discharge to the extent achievable by accepted completion methods and by commercially available well screens. Development

shall be accomplished by reversing flow direction, surging the well or by air lift procedures. No fluids other than formation water shall be added during development of a well unless the aquifer to be screened is a low yielding water bearing aquifer. In these cases, the water to be added should be chemically analyzed to evaluate its potential impact on in-situ water quality, and to assess the potential for formation damage.

For recovery and injection wells, well development methods may be utilized in accordance with standard engineering practice to remove fines and maximize well efficiency and specific capacity. Addition of freshwater and treatment agents may be utilized during well development or re development to remove drilling fluids, inorganic scale or bacterial slime. In these cases, the water and agents added should be chemically analyzed to evaluate their potential impact on in-situ water quality and to assess the potential for formation damage. All such additives shall be removed to the extent practicable during well development.

11. Each well shall be secured and/or designed to maintain the integrity of the well borehole and groundwater.

12. The above ground portion of the well must be protected by bumper guards and/ or metal outer casing protection when wells are located in traffic areas or outside the secured plant area.

13. The attached Table of Well Construction Details (Item 13) is to be completed or updated for each well installed and kept on site. Items in the table that require a yes or no answer indicate diagrams plans, or procedures that shall be kept on site and made available to inspection. The completed table and other records shall include all the following information:

    - name/number of well (well designation);
    - intended use of the well(sampling, recovery, etc.);
    - date/time of construction;
    - drilling method and drilling fluid used;
    - well location (+ 0.5 ft.);
    - bore hole diameter and well casing diameter;
    - well depth (+ 0.1 ft.);
    - drilling and lithologic logs;
    - depth to first saturated zone;
    - casing materials;
    - screen materials and design;
    - casing and screen joint type;
    - screen slot size/length;

- filter pack material/size;
- filter pack volume (how many bags, buckets, etc.);
- filter pack placement method;
- sealant materials;
- sealant volume (how many bags, buckets, etc.);
- sealant placement method;
- surface seal design/construction;
- well development procedure;
- type of protective well cap;
- ground surface elevation (+ 0.01 ft. MSL);
- top of casing elevation (+ 0.01 ft. MSL); and,
- detailed drawing of well (include dimensions).

14. Construction or plugging and abandonment of each well shall be completed in accordance with the requirements of 16 TAC Chapter 76 and must be reported/ certified to the TCEQ that such proper construction or plugging and abandonment has occurred following installation or plugging and abandonment. Well completion logs for each newly installed or replaced well shall be included with the report. The certification shall be prepared by a qualified geologist or geotechnical engineer. Each well certification shall be accompanied by a certification report, including an accurate log of the soil boring, which thoroughly describes and depicts the location, elevations, material specifications, construction details, and soil conditions encountered in the boring for the well. A copy of the certification and certification report shall be kept on site, and a second copy shall be submitted to the executive director.

15. The well number must be clearly marked and maintained on each well at the site.

16. The elevation of the top of each well casing must be measured in feet above mean sea level to the nearest 0.01 foot.

17. Wells must be replaced at any time the well integrity or materials of construction or well placement no longer enable the well to yield samples representative of groundwater quality.

18. Soil test borings shall be plugged and wells removed from service with a cement/bentonite grout mixture so as to prevent the preferential migration of fluids in the area of the borehole. Certification of each plugging shall be reported in accordance with Provision 14. The plugging of wells shall be in accordance with 16 TAC Chapter 76 dealing with Well Drilling, Completion, Capping and Plugging.

19. A well's screened interval shall be appropriately designed and installed to meet the well's specific objective (i.e., either DNAPL, LNAPL, both, or other objective of the well). All wells designed to detect, monitor, or recover DNAPL must be drilled to intercept the bottom confining layer of the aquifer. The screened interval to detect DNAPL should extend from the top of the lower confining layer to above the portion of the aquifer saturated with DNAPL. The screened interval for all wells designed to detect, monitor, or recover LNAPL must extend high enough into the vadose zone to provide for fluctuations in the seasonal water table. In addition, the sandpacks for the recovery or monitoring well's screened interval shall be coarser than surrounding media to ensure the movement of NAPL to the well.

Attachment C - Sampling And Analysis Plan

Introduction and Purpose

This Attachment was prepared for the purpose of providing guidance for the preparation of a Groundwater Sampling and Analysis Plan (SAP) to meet the requirements of 30 Texas Administrative Cod (TAC) 335.163(4) and (5) and also 40 CFR 270.30(j). This guidance is based on the publication, RCRA Groundwater Monitoring: Draft Technical Guidance (TEGD Update) (November 1992, USEPA), and its updates, and is not intended to be rule or policy, or include all acceptable practices.

When preparing the SAP, the applicant may insert copies of areas of the Compliance Plan Application already completed which provides any necessary information for completion of the SAP. The SAP should include the information described in the following sections. When certain sections are not applicable, please provide justification for omission from the SAP.

1. Pre Field Activity
    a. The log book format should be outlined in the SAP and should contain at a minimum:
        - the names of those conducting the sampling event;
        - the purpose and provision(s) of the compliance plan requiring the sampling event;
        - weather conditions at time of sampling;
        - date and time of collection;
        - well identification;
        - integrity of well;
        - monitoring well measurements, including: total well depth; static water level depth; measurement techniques; height of water column; well volume; and, notation of the presence or absence of accumulated silt (including thickness and measurement procedures);
        - notation of the presence or absence of NAPLs (including thickness and detection method);
        - well purging procedures, including equipment, purge volume, pumping rate, and well purge time;
        - sampling methods, including well sampling sequence, sampling equipment and withdrawal procedures;
        - visual and measured water quality parameters required for analysis, such as appearance, pH, conductivity, temperature and turbidity; and,
        - sample preservation and handling procedures, including types of sample bottles, sample identification numbers, preservatives used, and internal temperature of field and shipping containers.
    b. The SAP should reference the Provisions or Tables within the Compliance Plan regarding monitor well designations, parameters to be monitored, and sampling frequency, rather than utilizing detailed lists.
    c. The SAP should include examples of the log book format, chain of custody, and information to be included on the container labels and seals.
    d. The SAP should reference both the Health and Safety Plan, and Field Emergency Contingency Plan. These Plans should be checked to determine if they adequately address health and safety issues that may occur during a sampling event.
2. Prior to Purging Well

a. A. Procedures for evaluating the physical condition and integrity of the well should include:
   - inspecting the casing and cap for cracks, signs of deterioration or tampering;
   - determination if the cap and monitoring well are secure;
   - inspecting the well pad for cracks, or signs of deterioration, erosion, settling, and/or animal and insect burrowing; and,
   - where appropriate, inspect any dedicated equipment for signs of cleanliness, structural integrity and deterioration.

b. Procedures and equipment used for measuring groundwater elevations, well depths, silt accumulation, and Non Aqueous Phase Liquids (NAPLs) should be included in the SAP. Water levels should be measured from the surveyed datum on the top of the well casing, with a precision of ±0.01 foot. If present, accumulated silt and light/dense NAPLs should be measured for thickness.

c. Procedures for monitoring site specific weather conditions at the time of sampling should be incorporated into the SAP, including precipitation (when applicable), temperature, and approximate wind speed and direction.

3. Sampling Preparation Activity

a. Well purging methods:

(1) A sampling contingency plan should be developed for wells which are purged to dryness or purged such that full recovery exceeds two hours. In such instances, samples should be taken as soon as a sufficient volume of groundwater has entered the well to enable the collection of the necessary groundwater samples.

(2) In all instances of purging, the SAP should describe in detail the equipment used (dedicated or non dedicated), purging rate, and the method for determining volume purged.

(3) Although purging and sampling by bailers is acceptable, the EPA recommends the use of dedicated pumping equipment designed for low flow rates.

(4) When utilizing micropurging methods, the purge rate may range between 0.1 to 0.5 liter/minute. During micropurging, drawdown should not exceed 0.1 meter. The applicant should provide justification for any alternate sampling procedure. The SAP should also specify the well screen interval at which the pump intake is placed and a copy of the boring log for each well utilizing micropurging. In line measurements of redox, dissolved O2 and turbidity during purging of groundwater should stabilize within 10% over at least two measurements prior to sampling.

b. Field filtering of groundwater samples should not be conducted unless the applicant has provided a justification and field filtration is approved by the TCEQ. If samples are field filtered, a 10 micron filter should be used while still fulfilling the data quality objectives for the groundwater monitoring program.

c. The container type, size, and labeling method for each procedure performed should be referenced and/or tabulated in the SAP.

d. Sample blanks, field blanks, trip blanks and split sampling procedures, including frequency and preservation should be specified in the SAP as quality control checks for each sampling event. The preparation, analysis,

and evaluation of replicates, duplicates and spikes should also be included.

4. Well Sampling
   a. Well sampling equipment, collection procedures, and sampling sequence of wells, should be specified in the SAP. The SAP should include sampling equipment that is constructed of inert material, which should not alter analyte concentration due to loss of analyte via absorption, or gain via desorption, degradation or corrosion.
   b. Field QA/QC and sample preservation methods used to control pH, chemical addition and refrigeration of samples should be described in the SAP and follow the methods described in the current editions of EPA Report SW 846, "Test Methods for Evaluating Solid Waste" and American Society for Testing and Materials (ASTM) Standard Test Methods or other methods accepted by the TCEQ. The SAP should indicate that chemical preservatives are to be added to samples in the field and not in the laboratory. The SAP should indicate that coolants used for refrigerating samples need to be contained (e.g. blue ice).
   c. Procedures for sampling inorganics and volatile/semi volatile organics should be described in the SAP and follow the methods of SW 846 and ASTM or other methods accepted by the TCEQ.
5. Post Sampling Activity
   a. Decontamination procedures should be included in the SAP when dedicated equipment is not used for purging and sampling, or when dedicated equipment is stored outside the well. The procedures should include disassembly, cleaning of equipment, packaging and storage of equipment when not in use.
   b. Analytical methods and holding times should be tabulated in the SAP in accordance with SW 846 and ASTM or other methods accepted by the TCEQ.
   c. Chain of custody and shipping procedures should be described and intended to prevent misidentification of samples, to identify and prevent tampering of the samples during shipping and storage, and allow easy tracking of the shipment from the field to final analyses. A Chain of Custody Form should accompany each sample shipment and include the following information:
      - sample identification number;
      - signature of collector;
      - date and time of collection;
      - sample type (e.g. groundwater);
      - identification of sampling point (well);
      - number of containers;
      - parameters requested for analysis;
      - preservatives used;
      - signature(s) of person(s) involved in the chain of possession;
      - inclusive dates and time of possession;
      - internal temperature of shipping container when samples were sealed into the container for shipping; and,
      - internal temperature of container upon opening in the laboratory.

Samples should be shipped in coolers or similar containers designed to keep samples at a constant 4°C and prevent breakage. Containers used for sample shipment should be

sealed with the seal signed and dated by the sampler.

d. Disposal methods of contaminated equipment, wash water and purged groundwater should be described.

e. Laboratory QA/QC procedures should include control samples as defined in Chapter I of SW 846. An appropriate statistical method/procedure should be used to monitor and document performance and to implement an effective program to resolve testing problems (instrument maintenance). Data from the control samples (i.e. spiked samples, duplicates and blanks) should be used as a measure of performance or as an indicator of potential source of cross contamination (i.e. from instrumentation). QA/QC documentation for reporting values should be tabulated on laboratory data sheet and include: target analyte; unit of measure (e.g. ppm); method analyses; and, time/dates of sample collection and analyses.

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APPENDIX XI
APPLICATION RESPONSES
Compliance Plan

Alon USA, LP
Alon USA Big Spring Refinery
Big Spring, TX

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SUBSECTION XI.A.
SITE SPECIFIC INFORMATION

Figure IX.A.1.a. Plan View Map – Alon USA, GP Refinery - Big Spring, Texas

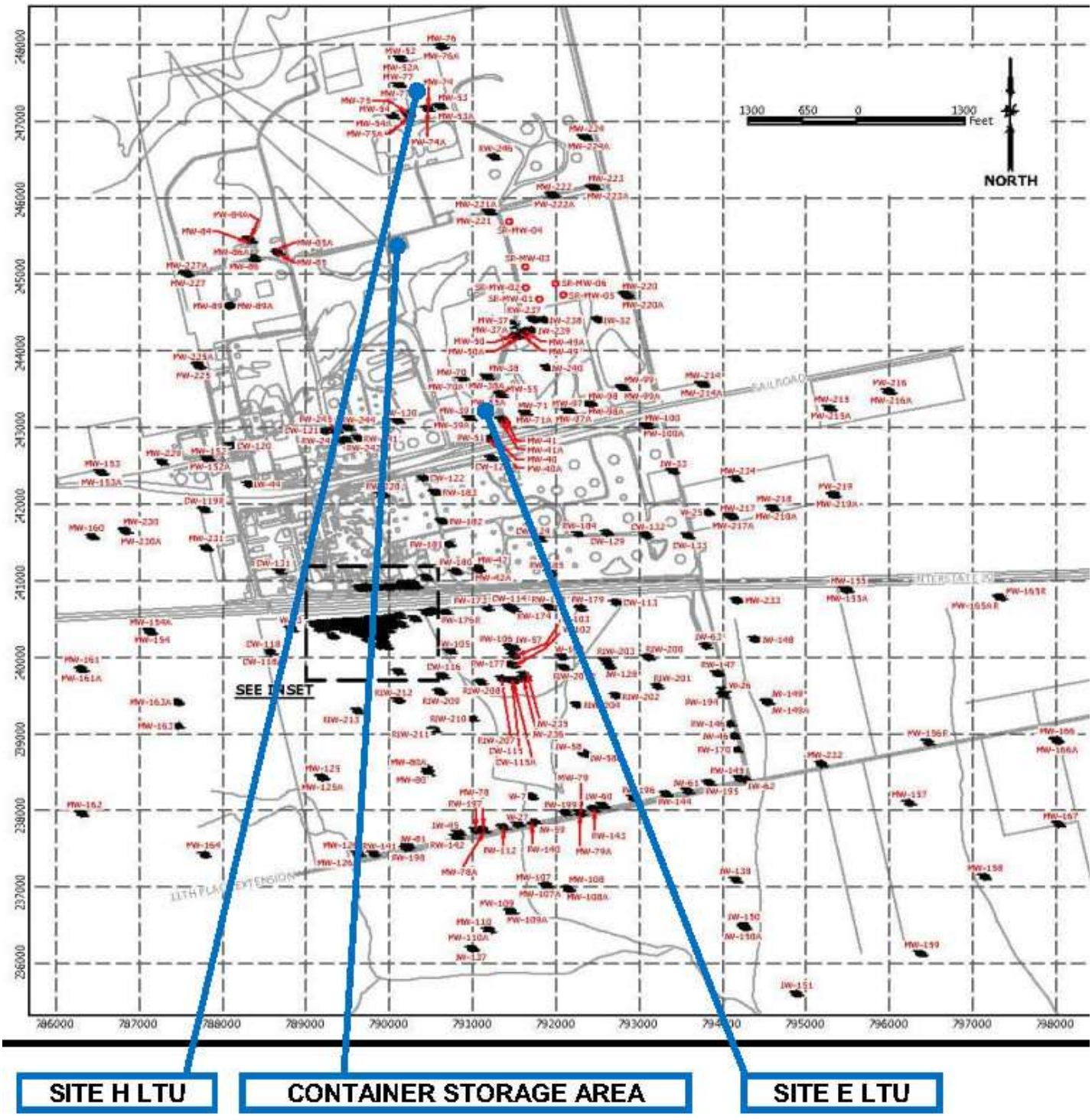
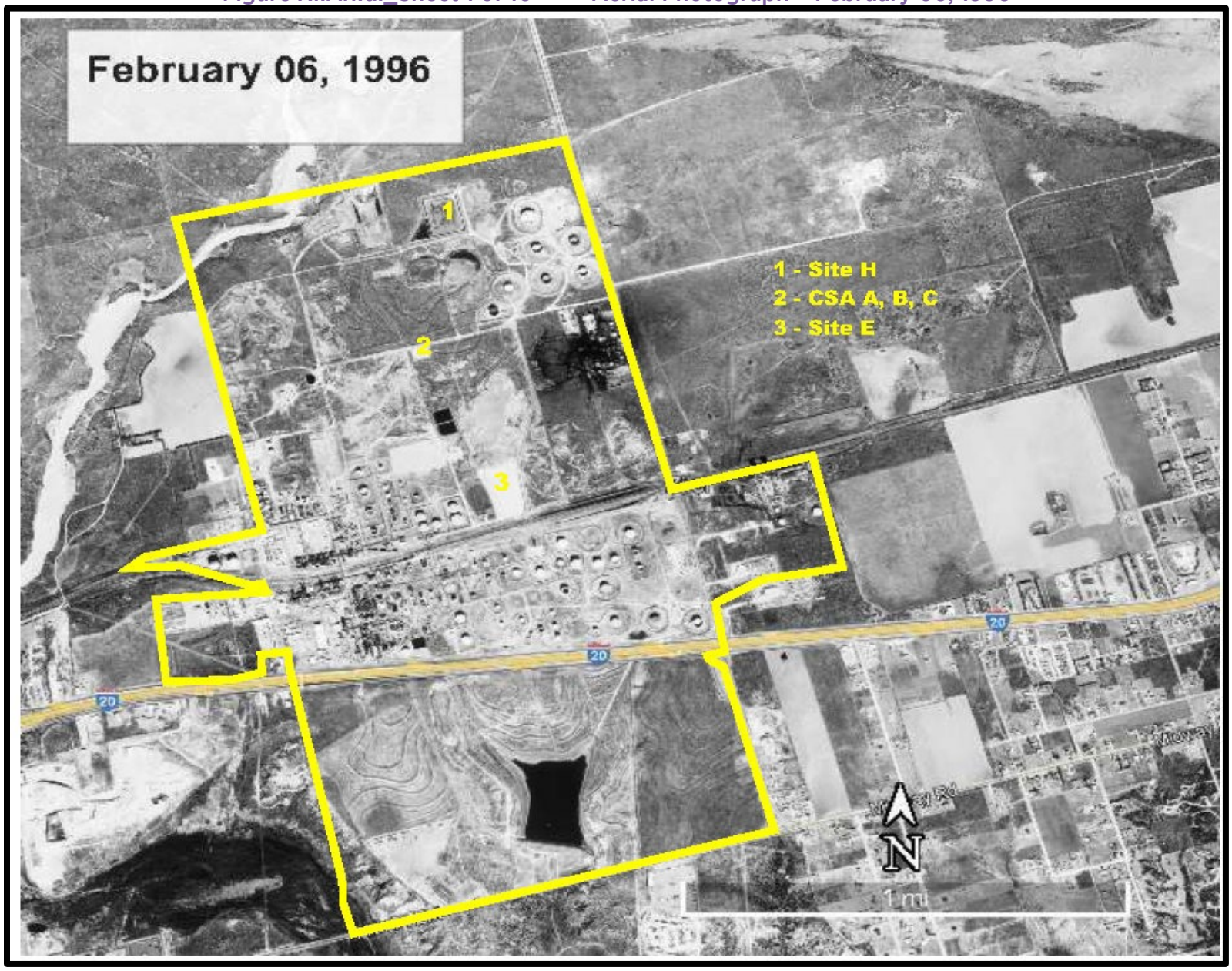


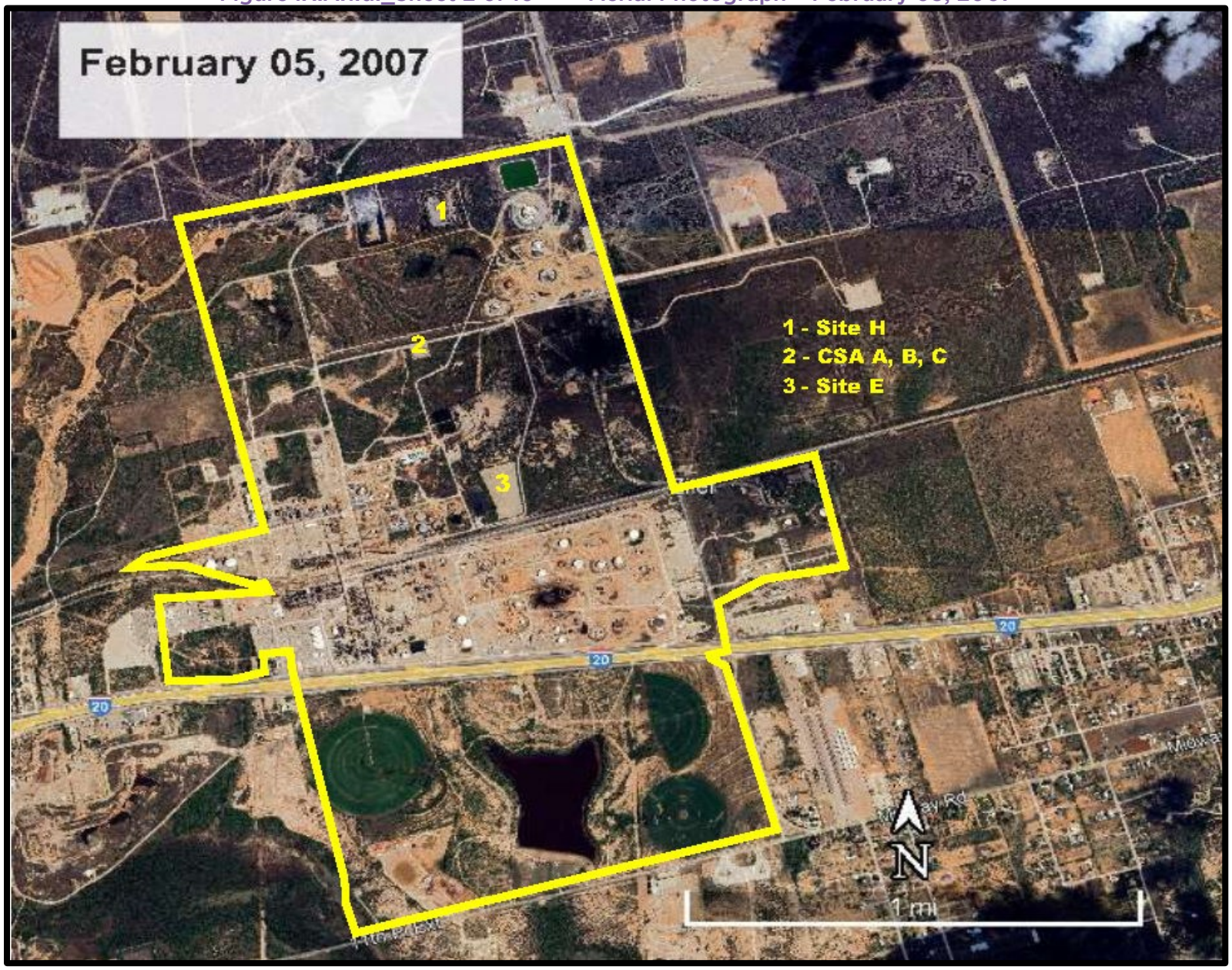
Figure XI.A.1.d._Sheet 1 of 10 Aerial Photograph – February 06, 1996



Source: Google Earth®

ATLAS

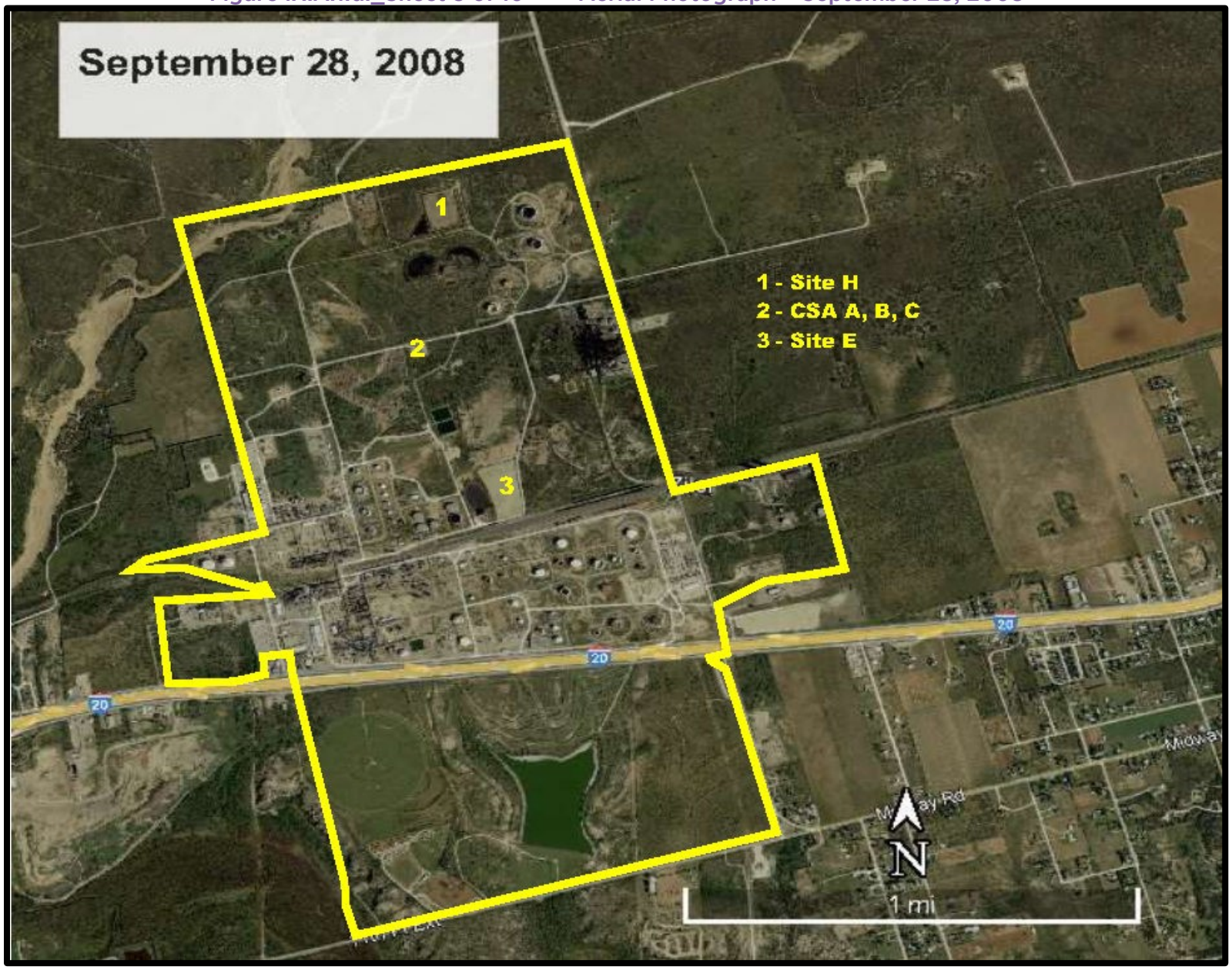
Figure IX.A.1.d._Sheet 2 of 10 Aerial Photograph – February 05, 2007



Source: Google Earth®

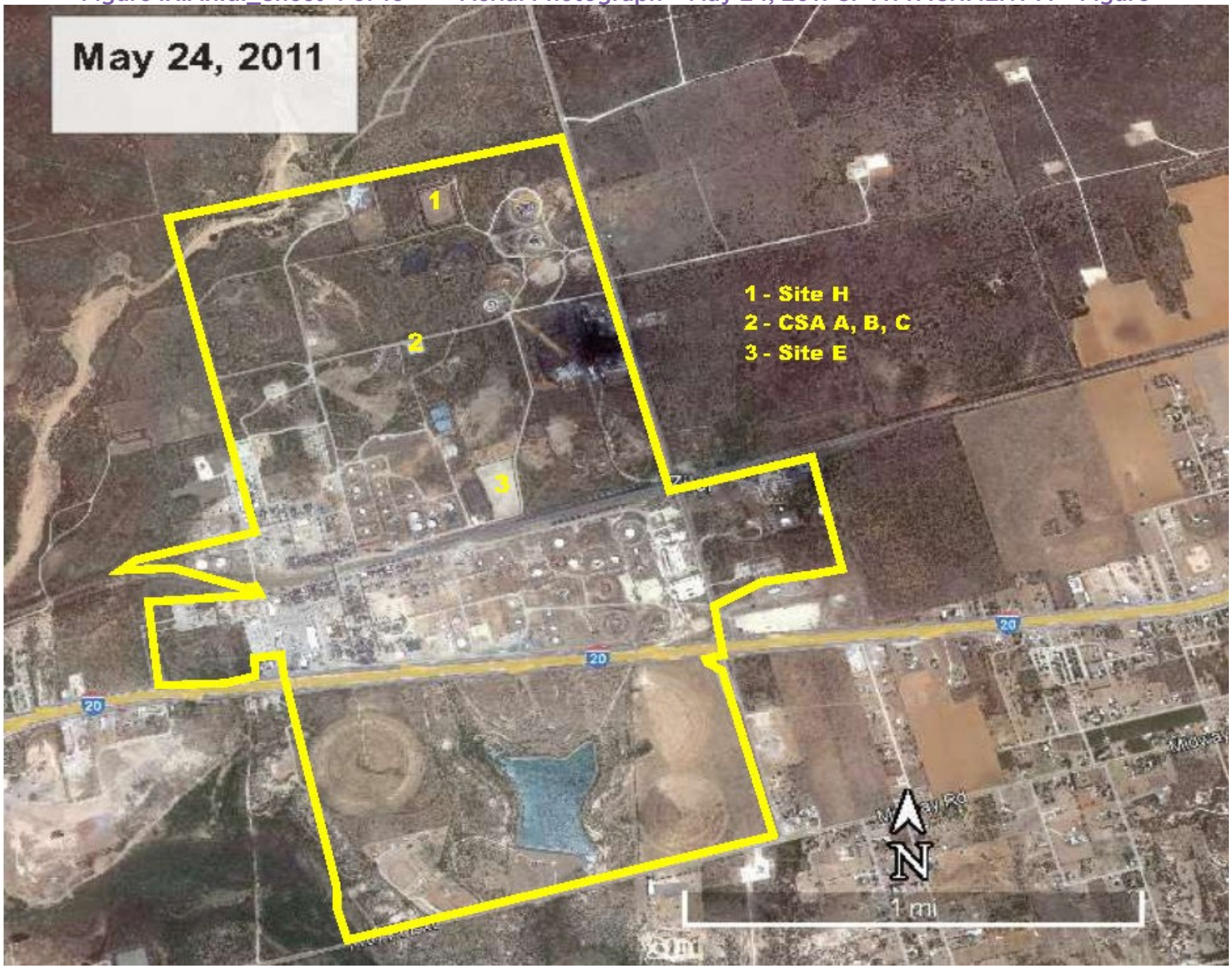
ATLAS

Figure IX.A.1.d._Sheet 3 of 10 Aerial Photograph – September 28, 2008



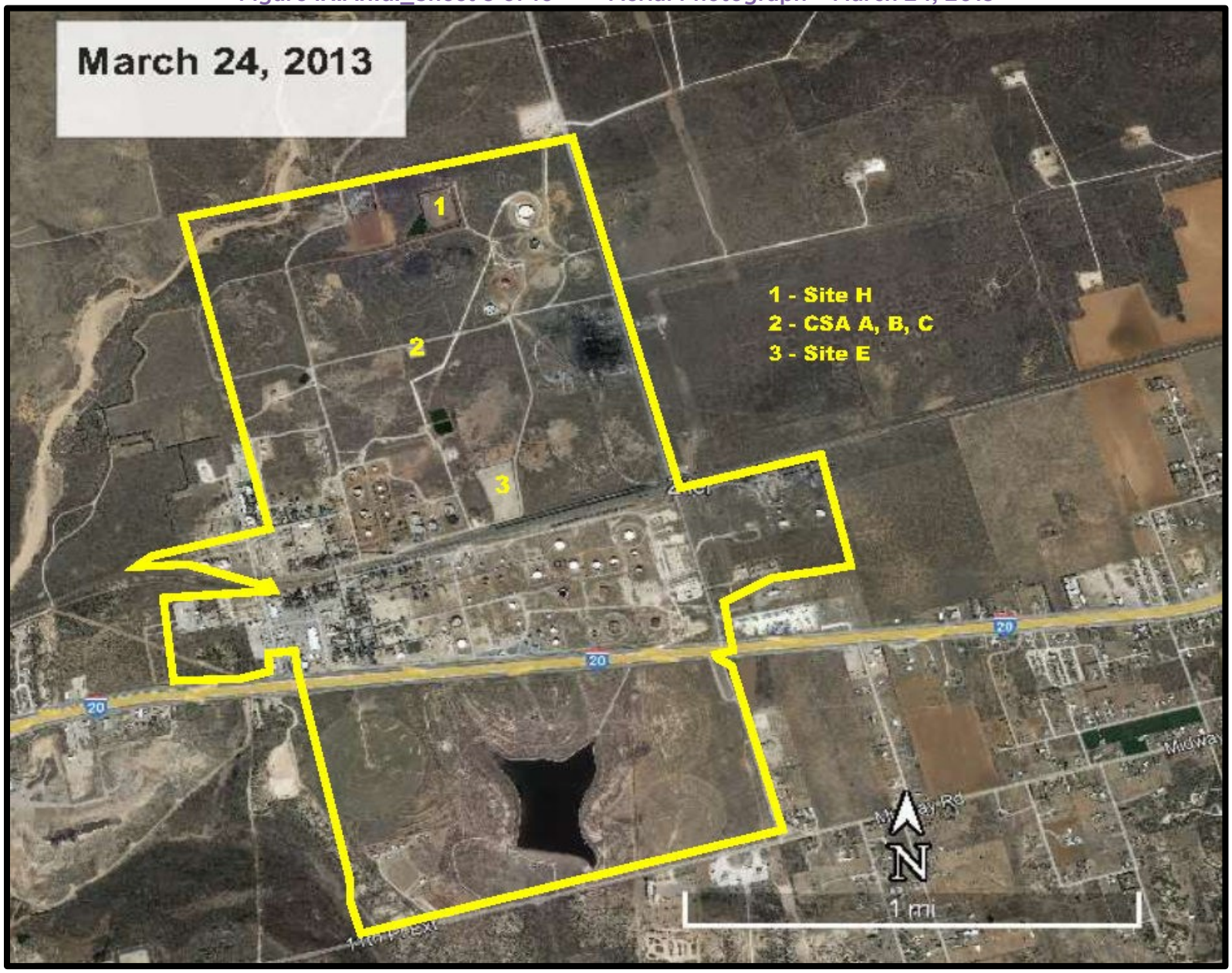
Source: Google Earth®

ATLAS



Source: Google Earth®

Figure IX.A.1.d._Sheet 5 of 10 Aerial Photograph – March 24, 2013



Source: Google Earth®

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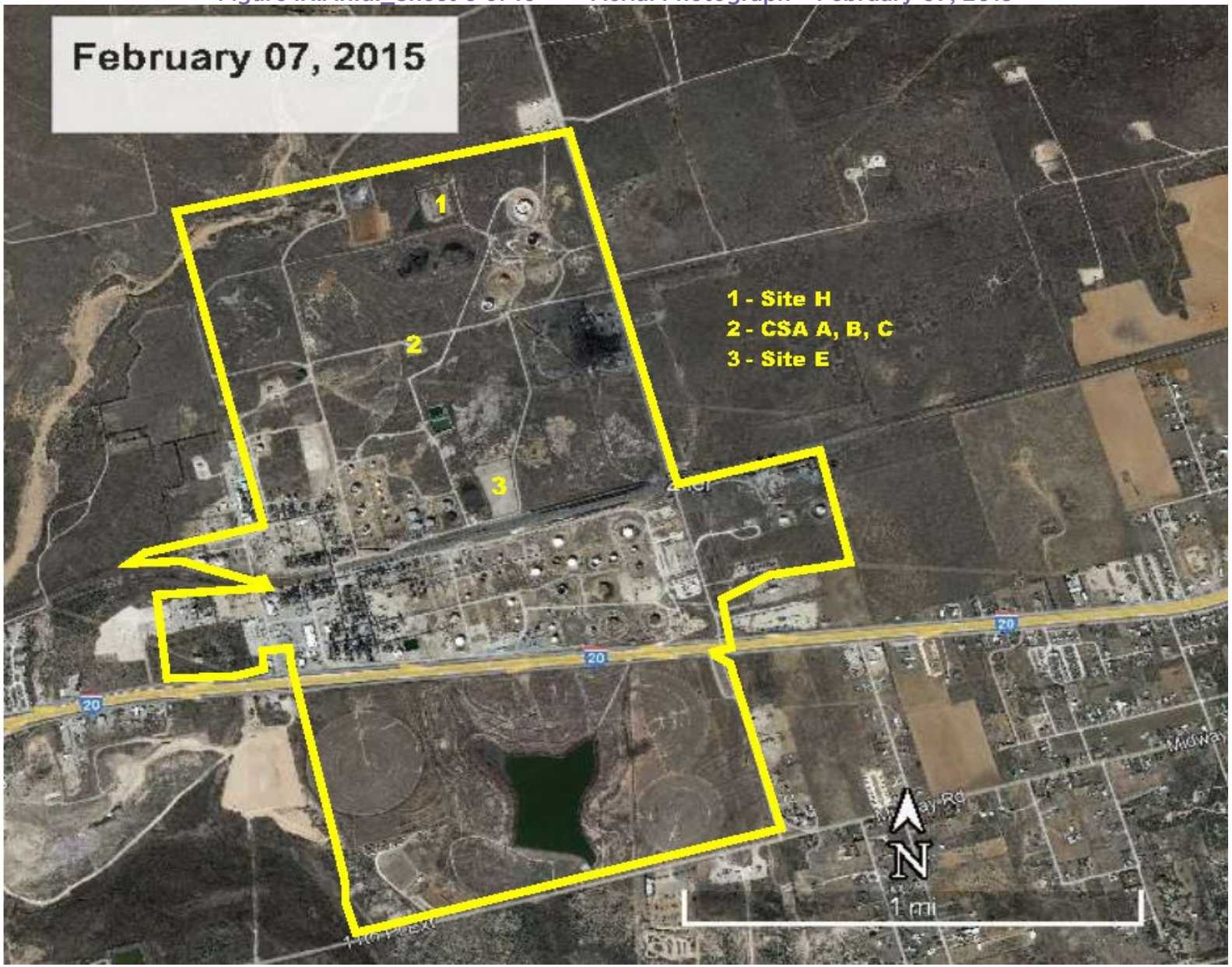
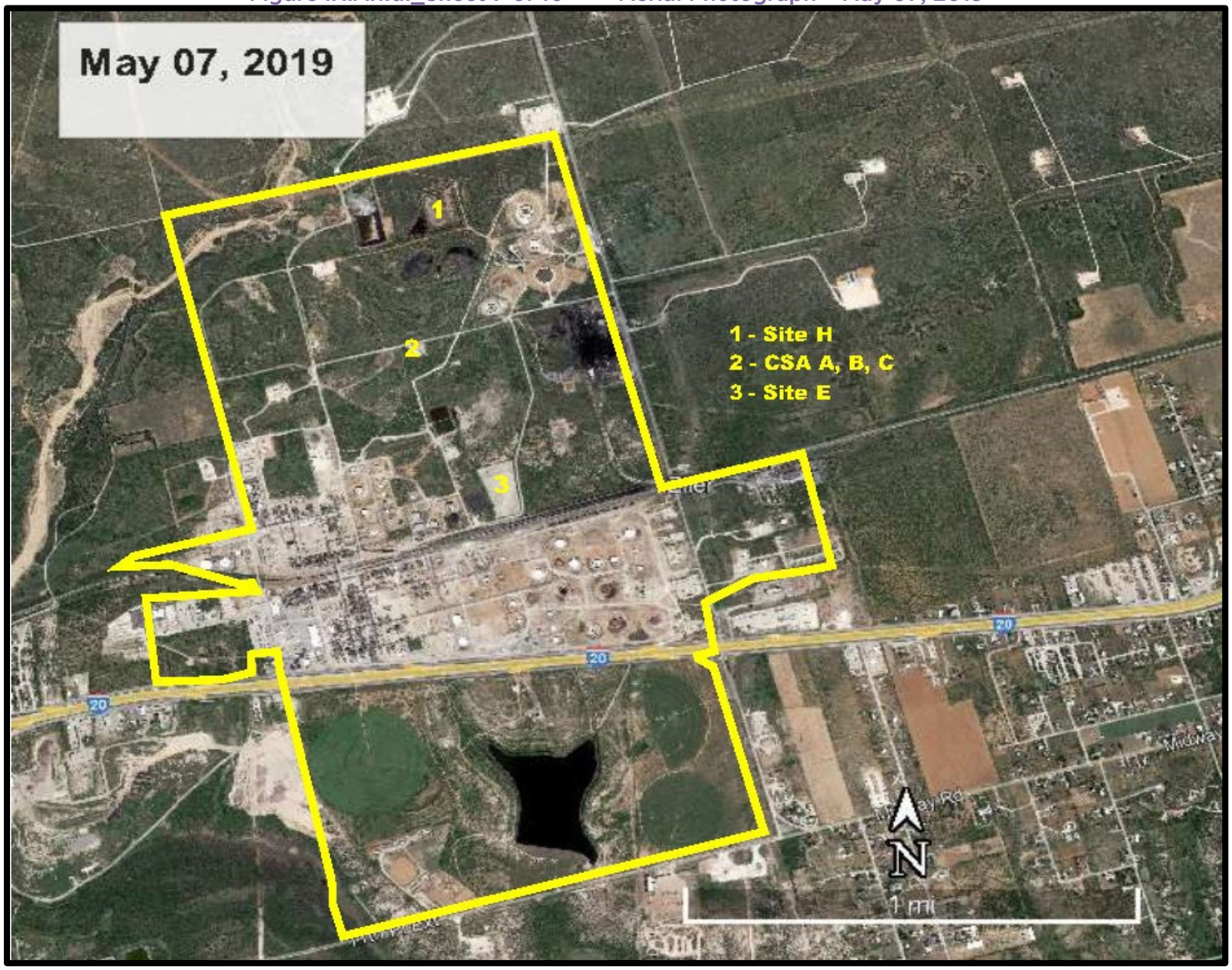
Figure IX.A.1.d._Sheet 6 of 10 Aerial Photograph – February 07, 2015



Source: Google Earth®

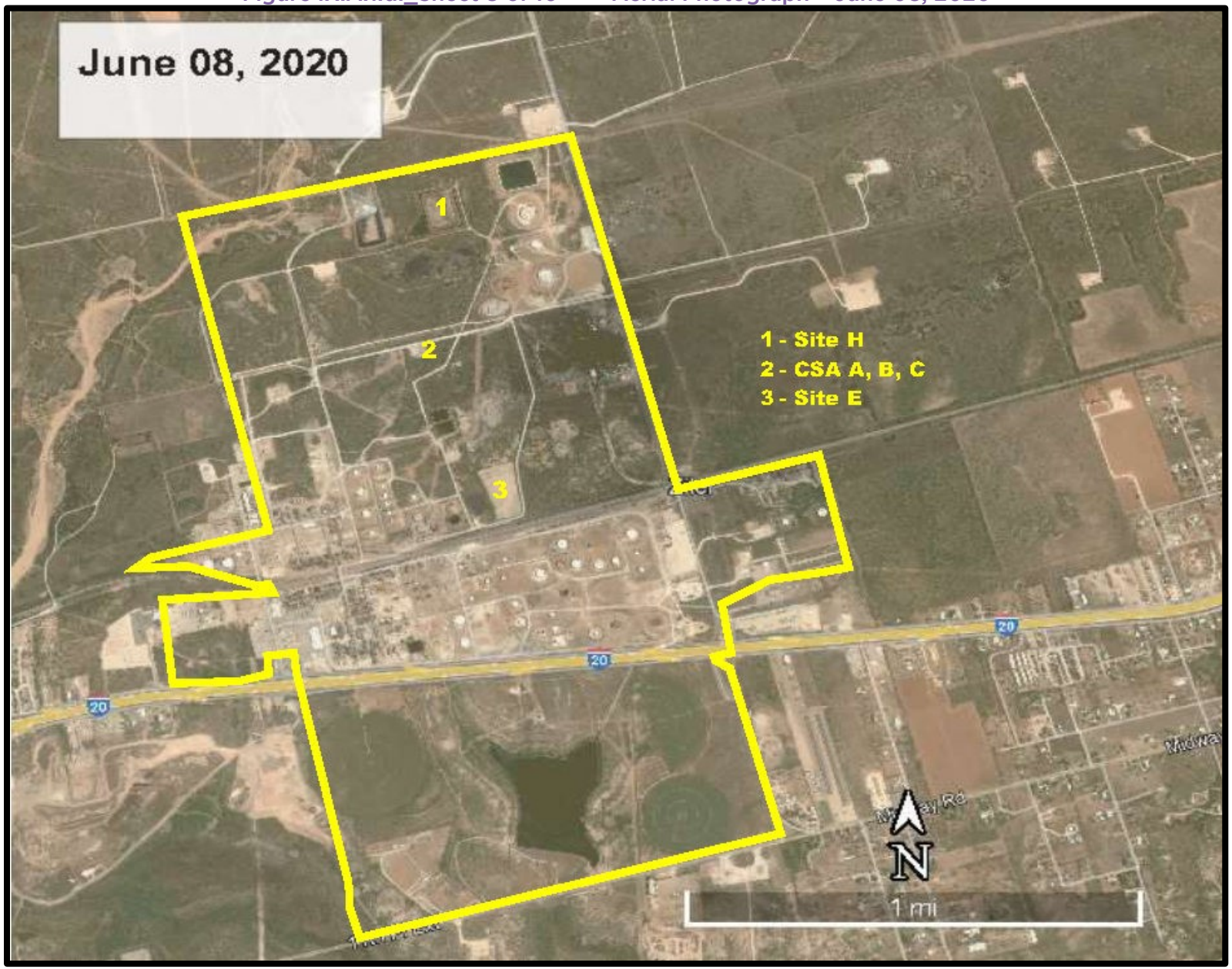
Figure IX.A.1.d._Sheet 7 of 10 Aerial Photograph – May 07, 2019



Source: Google Earth®

ATLAS

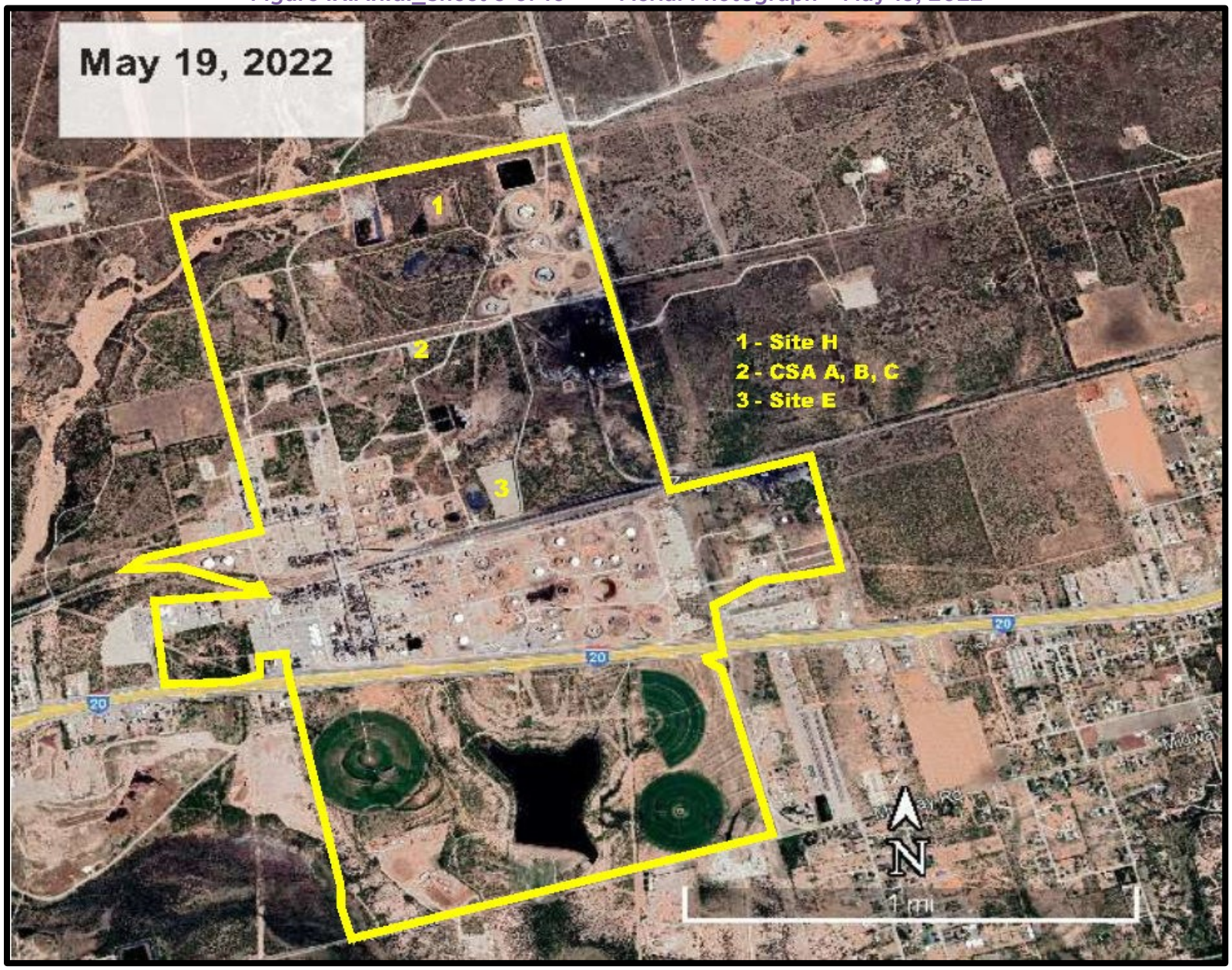
Figure IX.A.1.d._Sheet 8 of 10 Aerial Photograph – June 08, 2020



Source: Google Earth®

ATLAS

Figure IX.A.1.d._Sheet 9 of 10 Aerial Photograph – May 19, 2022



Source: Google Earth®

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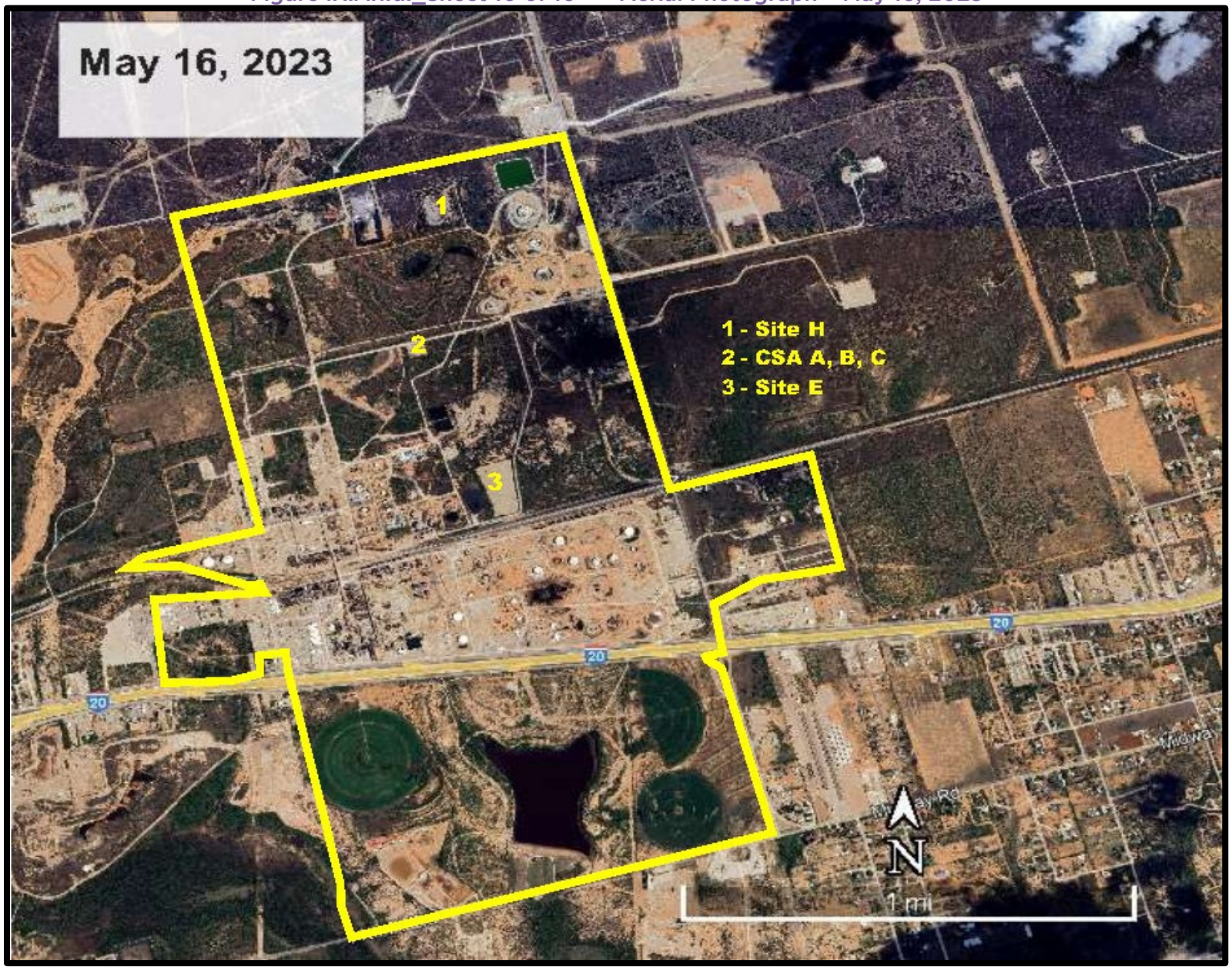
Figure IX.A.1.d._Sheet 10 of 10 Aerial Photograph – May 16, 2023



Source: Google Earth®

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Figure VI.A.4.g-1 LNAPL Plumes for January 2024

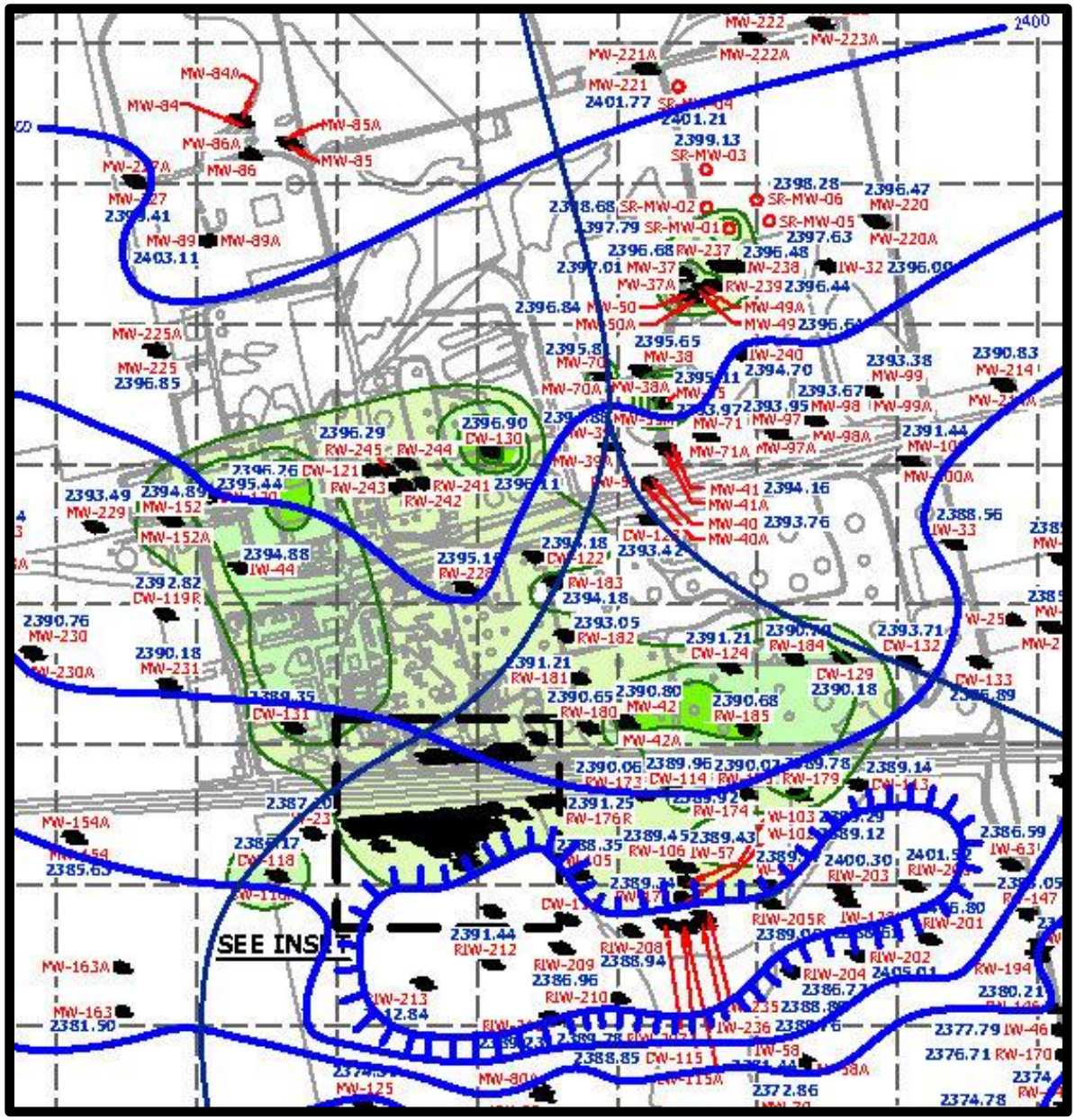


Figure XI.A.4.g-2 Benzene Upper Sand Plumes for January 2024

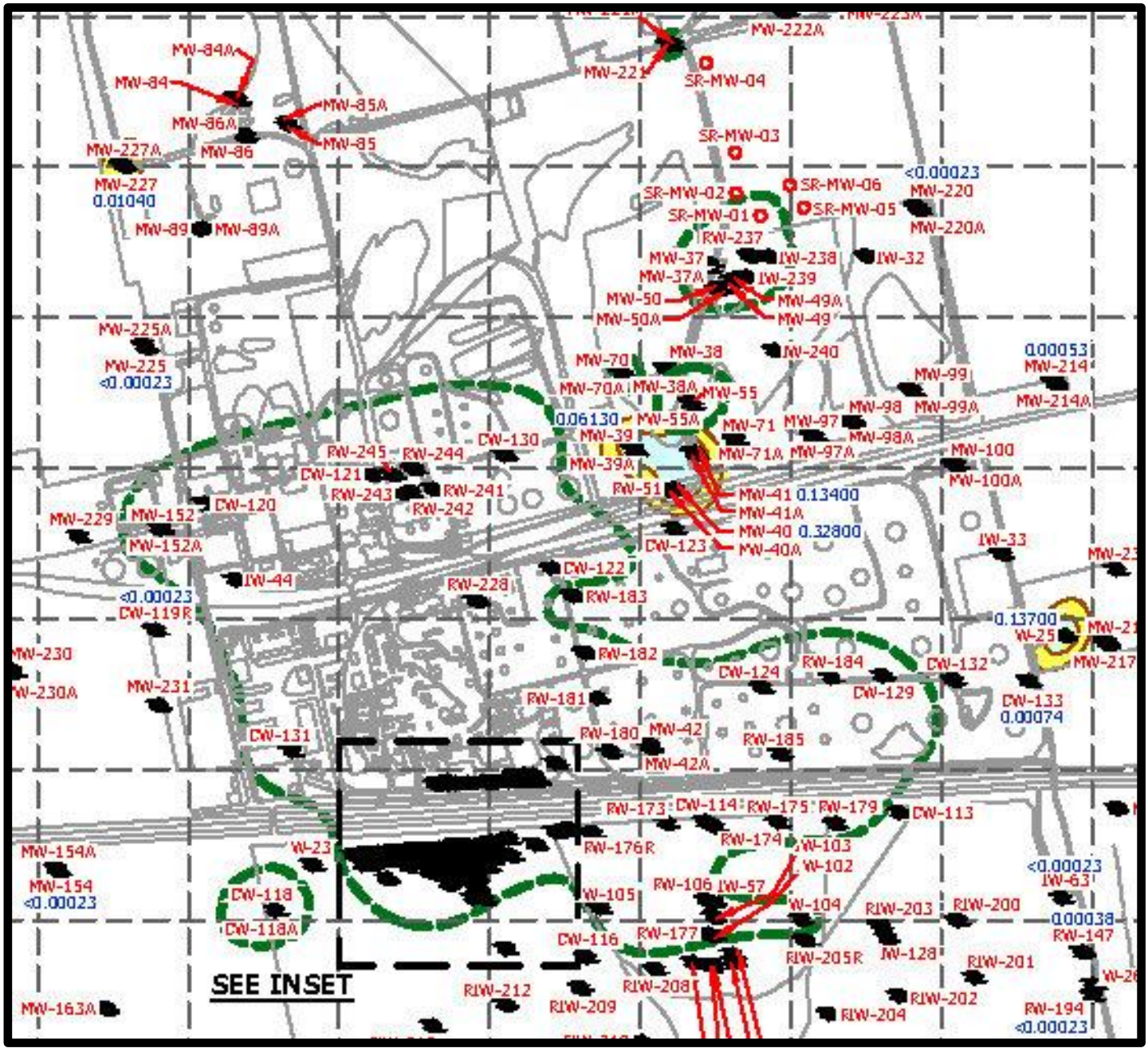


Figure VI.A.4.g-3 Benzene Lower Gravels Plumes for January 2024

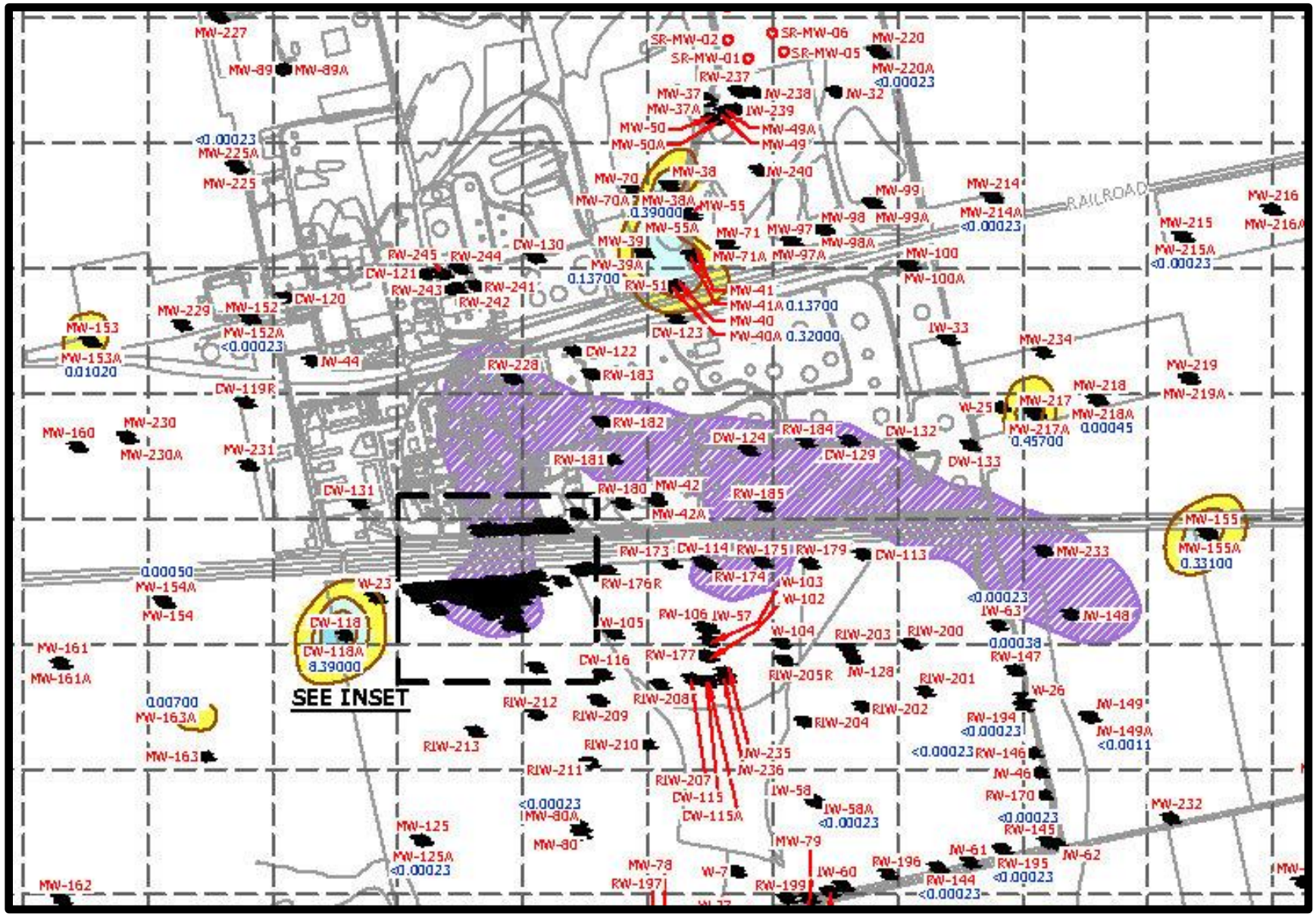


Figure VI.A.4.g-4 Dissolved Oxygen Plumes in Upper Sand for January 2024

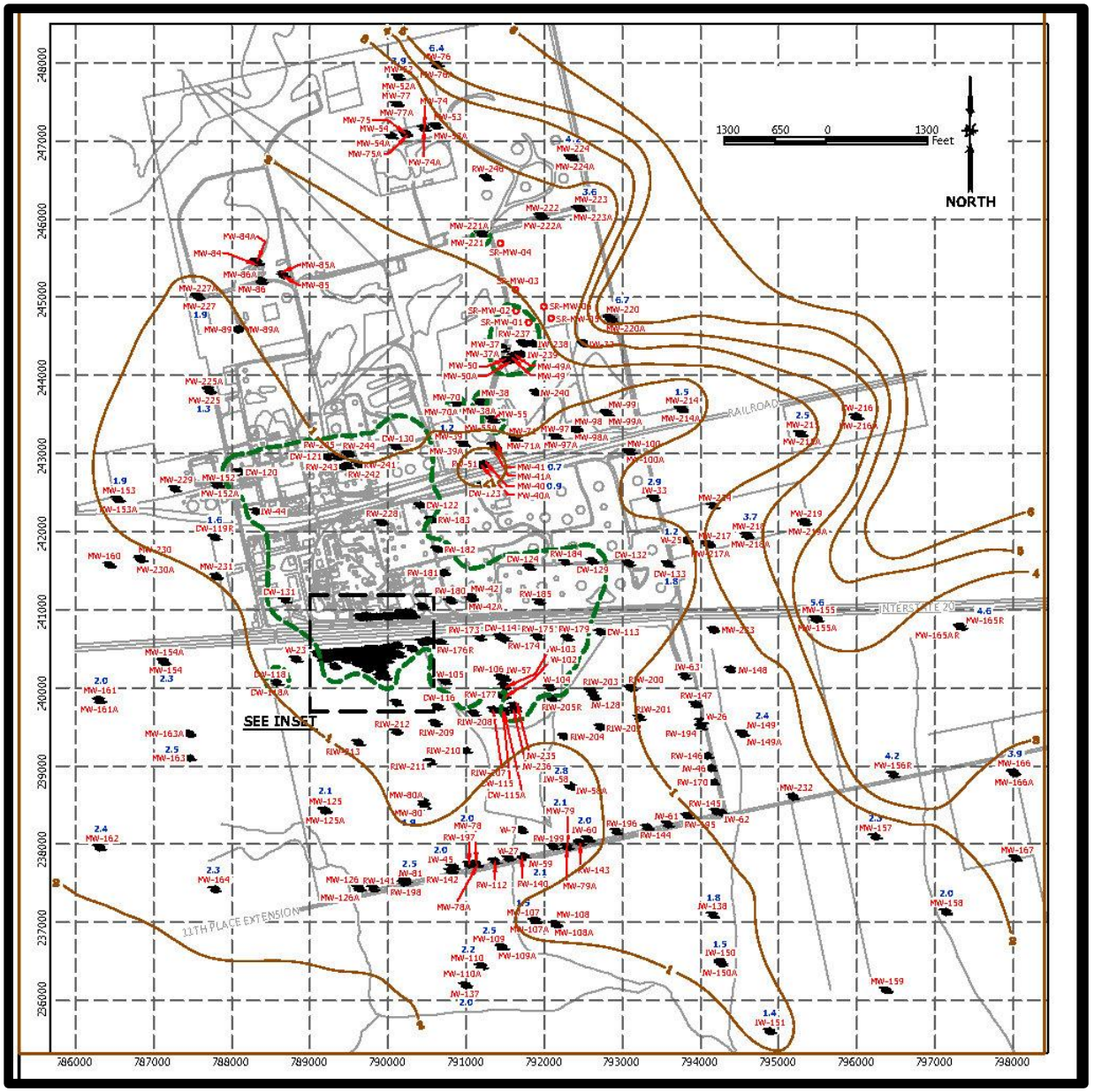


Figure VI.A.4.g-5 Dissolved Oxygen Plumes in Basal Gravels for January 2024

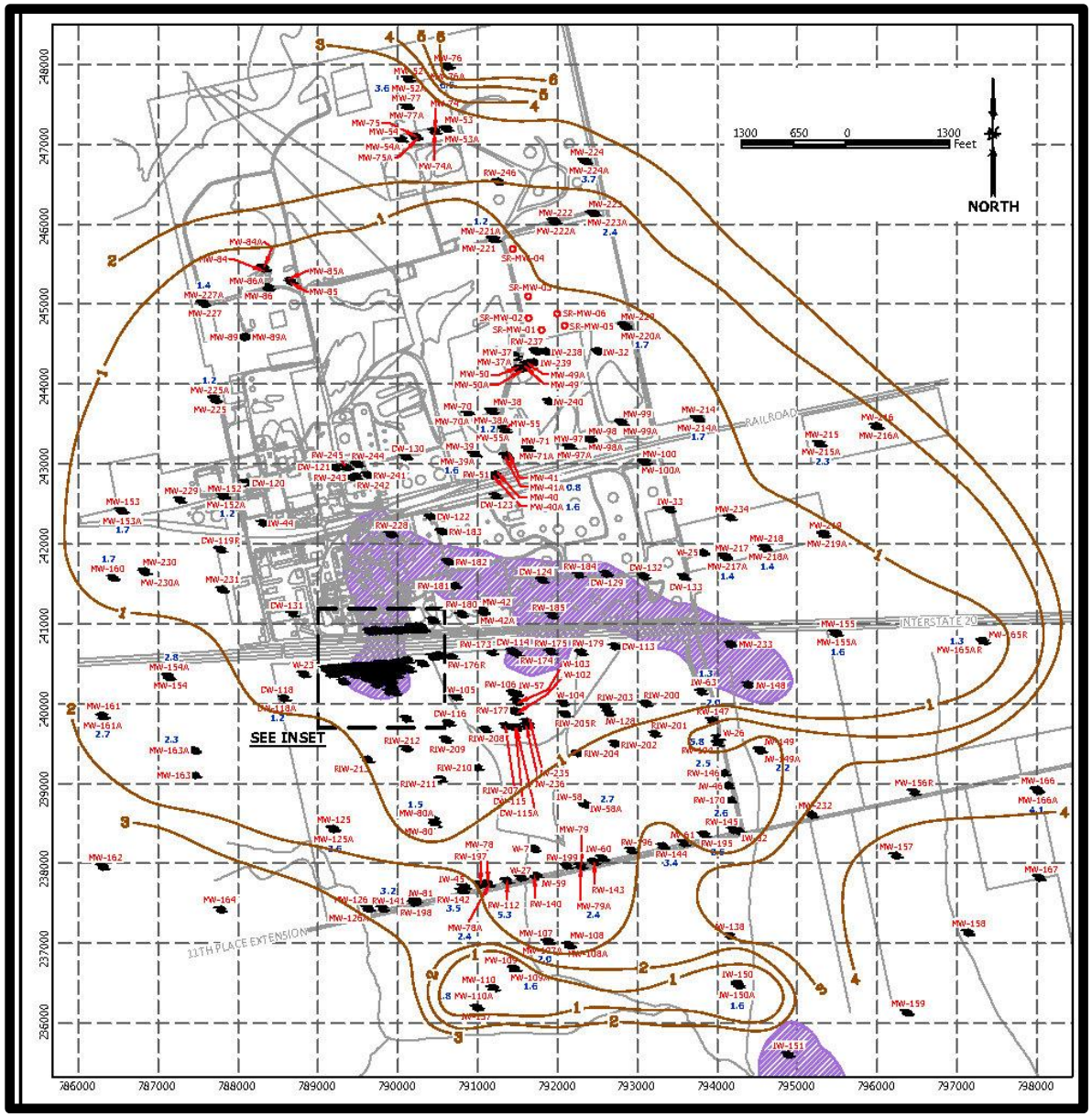


Figure VI.A.4.g-6 Total Dissolved Solids in Upper Sands for January 2024

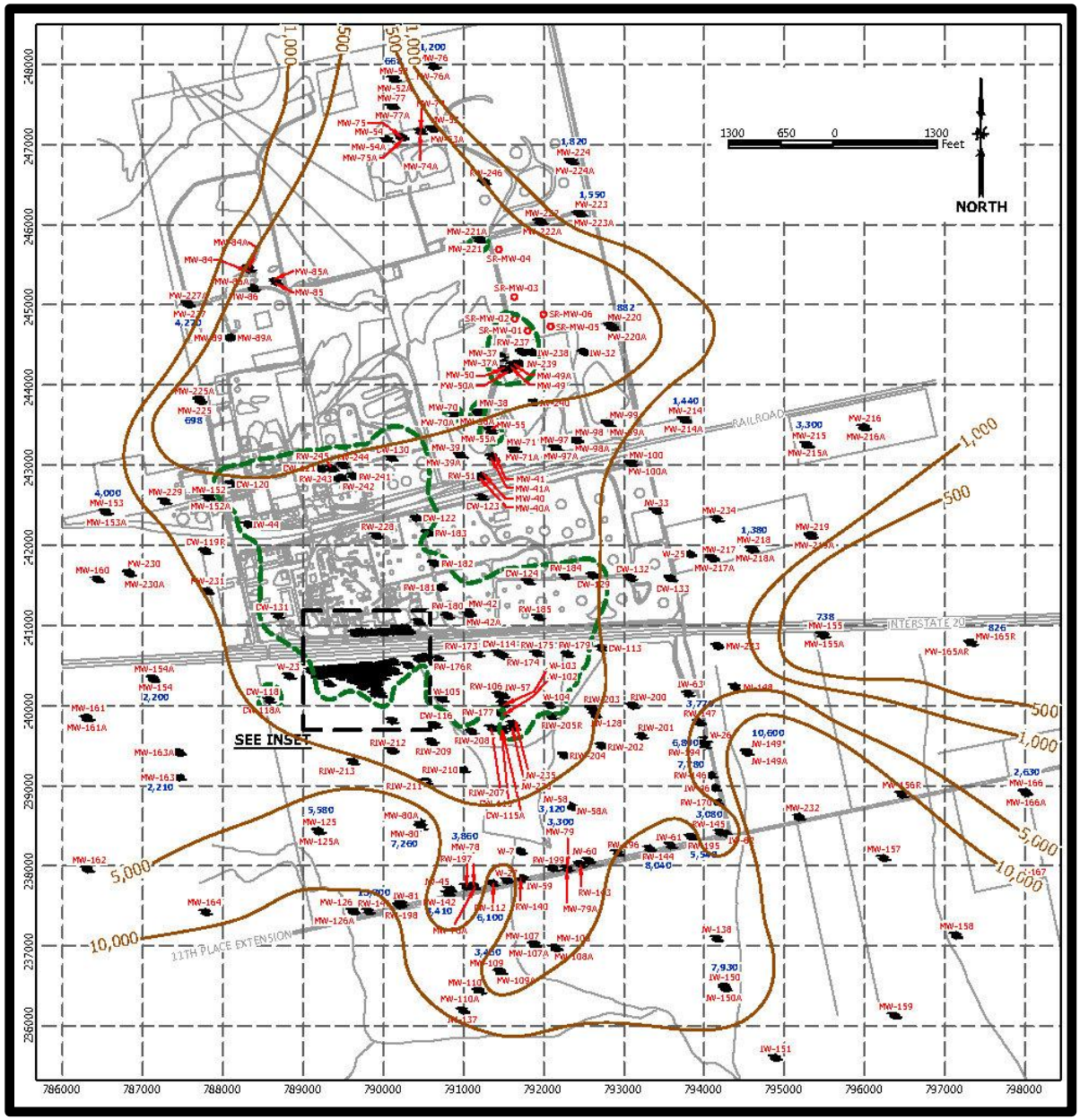


Figure VI.A.4.g-7 Total Dissolved Solids in Basal Gravel for January 2024

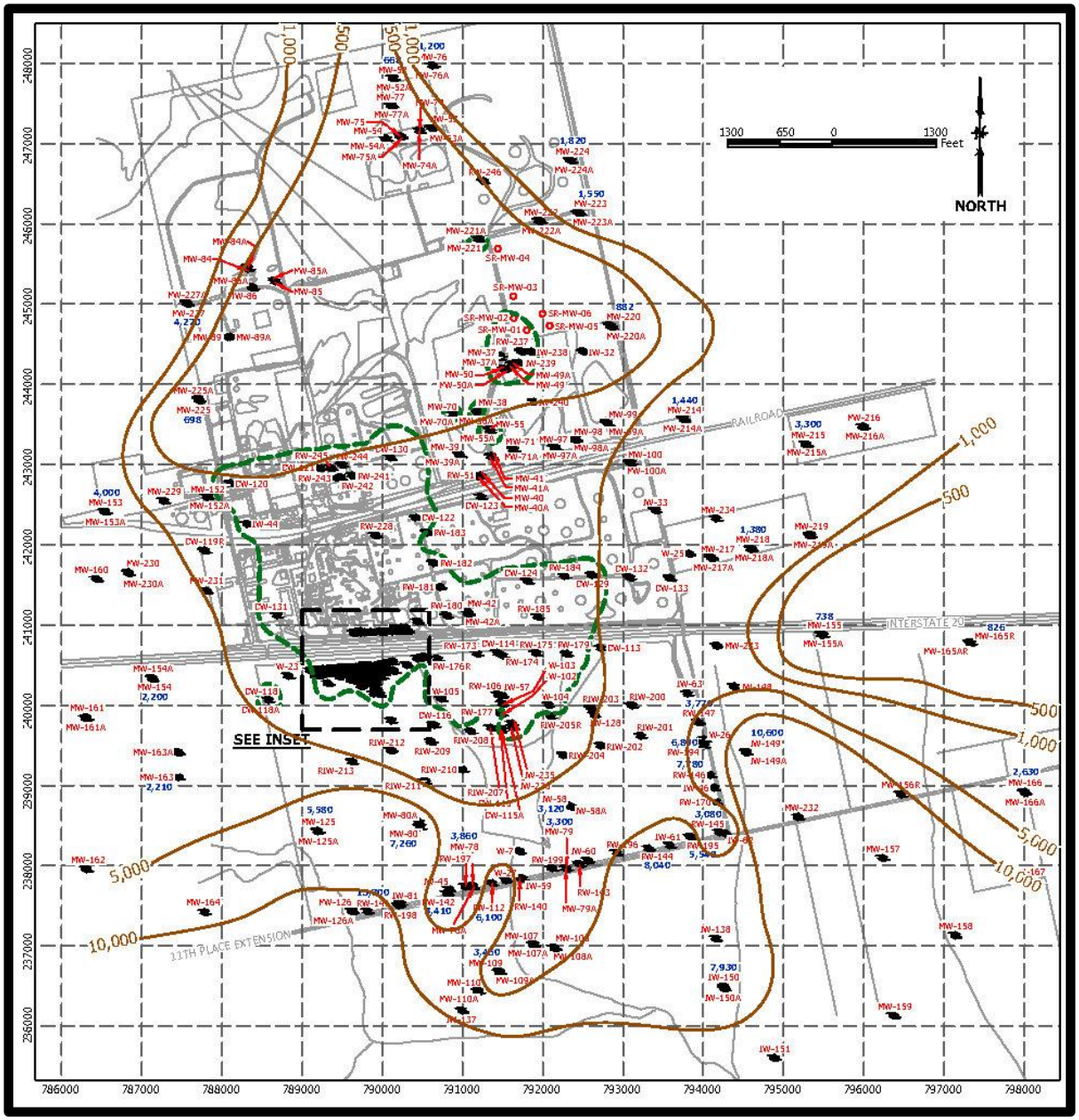


Figure VI.A.4.g-8 Oxidation-Reduction Potential in Upper Sand for January 2024

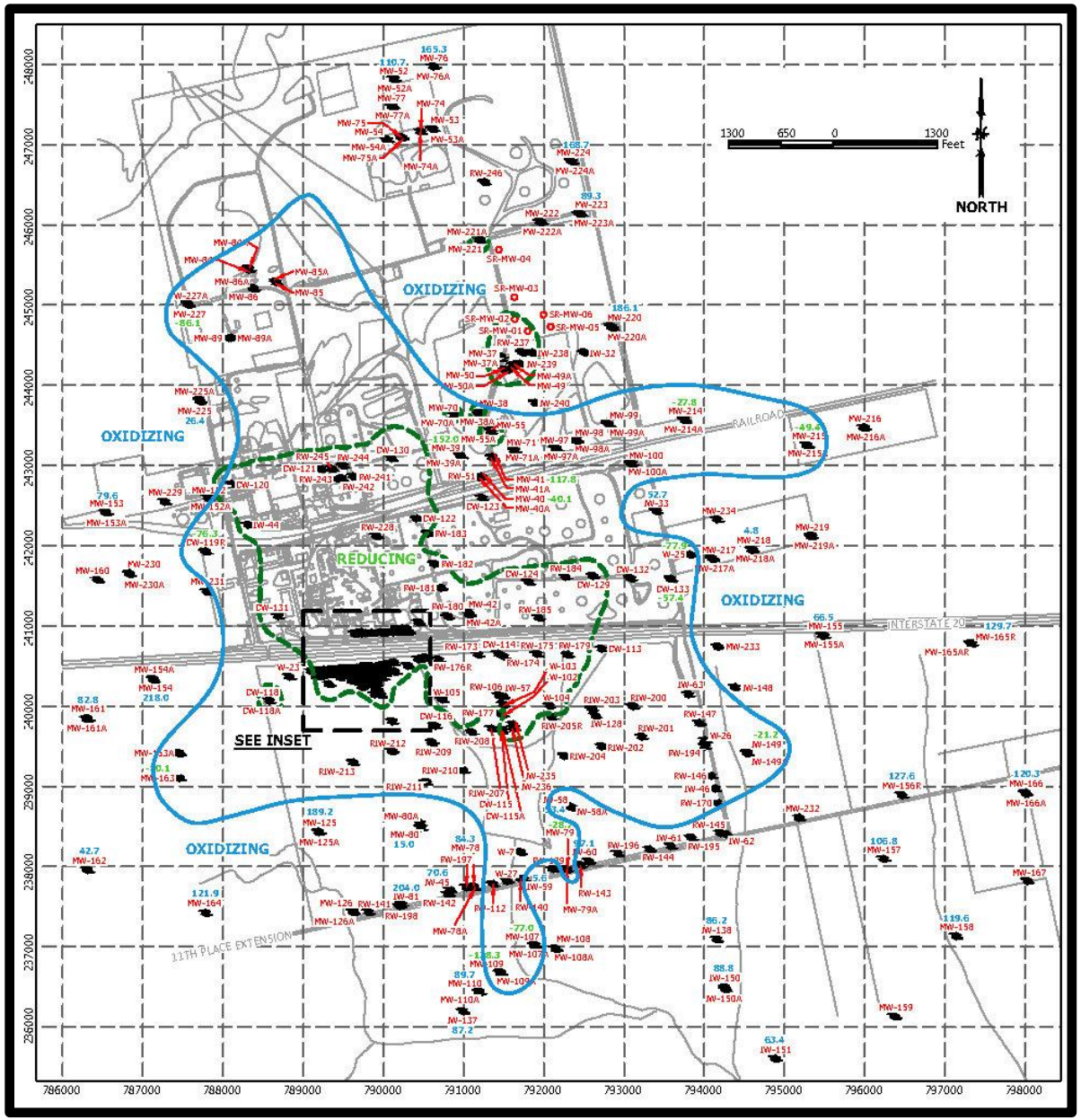
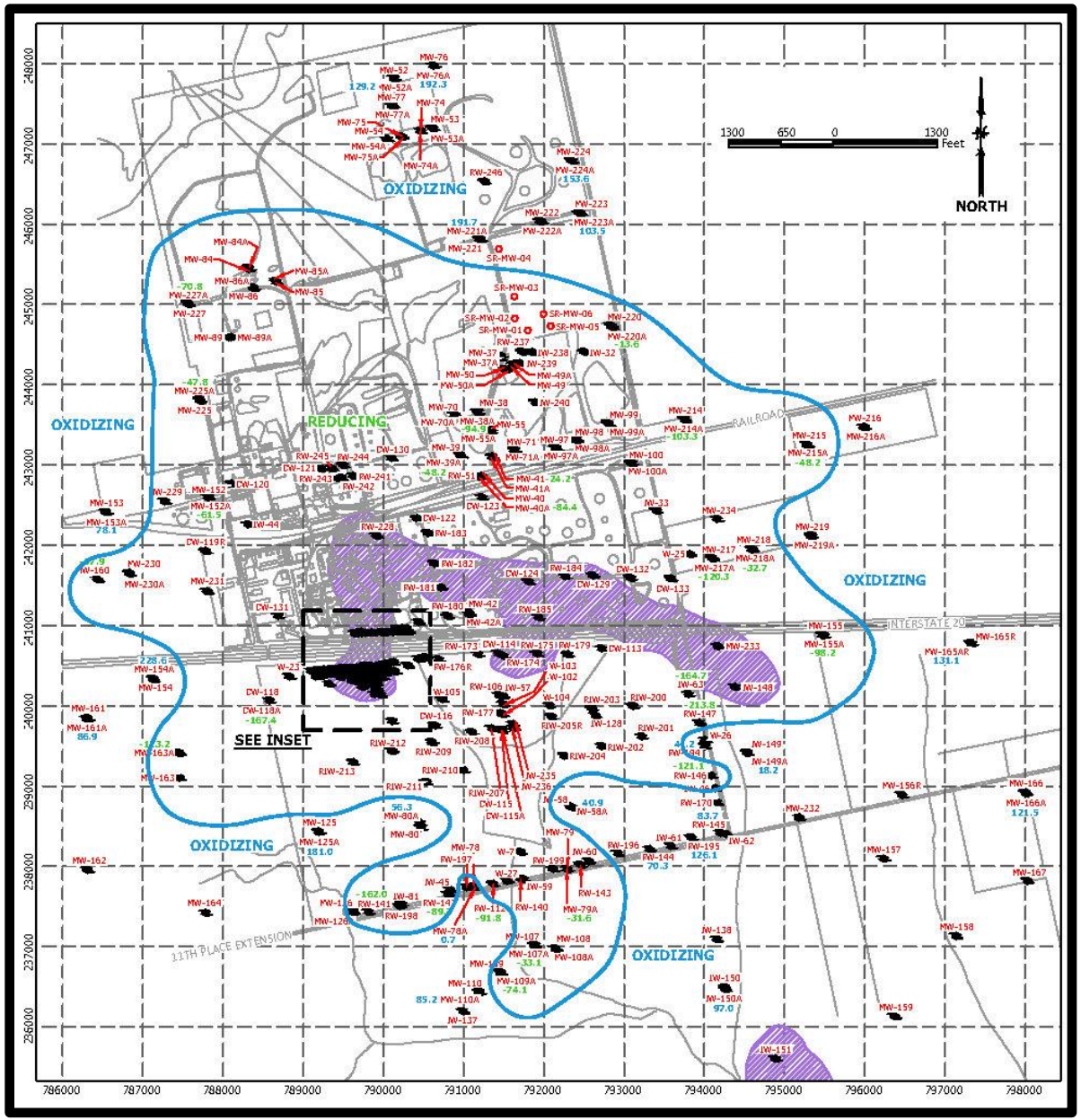


Figure VI.A.4.g-9 Oxidation-Reduction Potential in Basal Gravel for January 2024



Supplemental Table XI.A. - SECTION IX – COMPLAINCE PLAN SUPPLEMENTAL INFORMATION:

SECTION	DESCRIPTION	RESPONSE
SUBSECTION XI.A, - SITE SPECIFIC INFORMATION		
A.1.a.	Plan View Map	See Figure XI.A.1.a. - Plan View Map - Alon USA, GP Refinery - Big Spring, Texas [1 sheet]
A.1.b.	Topographic Map	See Figure XI.A.1.b. - Topographic Map [1 sheet]
A.1.c.	Oversize Maps	na
A.1.d.	Historical Aerial Photographs	See CP Attachment A, Figure IX.A.1.d. - Aerial Photographs [10 sheets]
A.2.	Waste Management	See Figure CP II.A.2 - General Site Plan View Map
A.2.a.	Haz Waste Management Units Monitored	Site H - Detection Monitoring Figure CP XI.A.2. (Sheets 1, 2, and 5) Site E - Corrective Action Monitoring - Figure CP XI.A.2. (Sheets 1, 3, and 6) BICA AREA - Corrective Action Program - Figure CP XI.A.2. (Sheets 1, 3, and 4)
A.2.b.	SWMU/AOC Recommended for Further Investigation	Not Applicable - No SWMUs or AOCs are recommended for further investigation and/or No Further Action designation received - See Section IX.A. - Preliminary Review Facility Checklist and See Section IX.B.. - Preliminary Review Unit Checklists
A.2.c.	On-Site WWT Units	See Figure CP XI.A.2. - Plan View
A.3.	Facility History	See Tables CP Table I and CP Table II
A.4.	Site Geology, Hydrogeology	Refered Sections in Attachment VI, Geology Report
A.4.a.	Description site geology	See Attachment VI Geology Report, , specifically Section VI.A.3.a, Tables VI.A.1, Figures VI.A.b.
A.4.b.	Site soils, subsurface lithologies using USCS	See Section VI Geology Report, specifically Section VI.A.4.
A.4.c.	Soil Remediation	Not Applicable - no soil remediation required at this time
A.4.d.	Uppermost saturated zone	See Section VI Geology Report, specifically Section 2 VI.B., Tables VI.B.2.a, b, c, e.
A.4.e.	Geologic, Stratigraphic Hydrogeologic Information	See Section VI Geology Report, specifically Section 1 VI.B., Tables VI.B.2.a. b. c. e, Figure VI.A.4.b.
A.4.f.	Maps of lateral/verticle extent of contamination	See Section VI Gelolgy Report specifically Figures VI.A.1a(7)-1, 2, 3. Also Appendix III, Evidence of Release
A.4.g.	Current contamination maps	See Figures XI.A.4.g-1 (LNAPL), -2 (Benzene in Sands, -3 (Benzene in Gravels), -4 (DO Sand), -5 (DO in Gravels, -6 (TDS in Sand), -7 (TDS in Gravel), 8 (ORP in Sand), -9 (ORP in Gravel)
A.4.h.	Cross-Sections	See Attachment VI Geology Report specifically Section 1 VI.A.1.a(4), Section VI.A.4.b., Figure VI.A.4.b, c, h.
A.4.i.	Well construction diagrams	See Section VI Geology Report, specifically Attachements VI.B.3.d [Site H Logs]. and VI.B/4.a.[Site E Logs]
A.4.j.	Potential for surface waster hydraulic connection	Impacted groundwater discharge to the downgradient surface water body (Beals Creek) is highly unlikely due to the hydrologic setting. Beals Creek is a losing stream along the downgradient boundary in with high, naturally occuring TDS creating both a hydraulic and density barrier to groundwater inflow from the north.

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SUBSECTION XI.B
GROUNDWATER PROTECTION STANDARD

SUPPLEMENTAL TABLE XI.B.[a]

BICA HISTORICAL RESULTS - 1,2-DICHLOROETHANE

Well >	RW-112	RW-141	RW-142	RW-144	RW-145	RW-146	RW-147	RW-194	RW-195	RW-106	RW-179	RW-192	MW-221
Constituent >	1,2-DCA	1,2-DCA	1,2-DCA	1,2-DCA	1,2-DCA	1,2-DCA	1,2-DCA	1,2-DCA	1,2-DCA	1,2-DCA	1,2-DCA	1,2-DCA	1,2-DCA
$^{GW}GW_{Class3}$ >	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l
Sat. Zone >	Sand & Gravel	Sand & Gravel	Sand & Gravel	Sand & Gravel	Sand & Gravel	Sand & Gravel	Sand & Gravel	Sand & Gravel	Sand & Gravel	U. Sand	U. Sand	U. Sand	U. Sand
JUL-96	<0.005				**0.006**								
JAN-97	**0.080**				**0.009**	**0.005**	**0.008**	<0.005	**0.098**				
JUL-97		<0.005	**0.110**	**0.026**				**0.007**	**0.050**				
OCT-97	**0.084**	**0.116**	**0.092**	**0.011**	<0.005	**0.016**	**0.050**	**0.050**	**0.059**				
APR-98	**0.350**	**0.150**	**0.140**	**0.014**	0.510	**0.029**	**0.084**	**0.074**	<0.005				<0.005
Oct-98	**0.100**	**0.087**	**0.100**	<0.005	**0.007**	**0.031**	**0.055**	**0.031**	**0.091**				<0.005
Jan-99													<0.005
Apr-99	**0.081**	**0.096**	**0.140**	**0.010**	**0.014**	**0.019**	**0.066**	**0.030**	**0.040**				<0.005
Jul-99													<0.005
Oct-99	**0.100**		**0.130**	<0.005	**0.012**	**0.018**	**0.220**	**0.043**	**0.056**				<0.005
Apr-00	**0.085**	**0.110**	**0.110**	<0.005	**0.018**	**0.046**	**0.150**	**0.063**	**0.056**				<0.005
Oct-00	**0.120**	**0.076**	**0.110**	<0.005	**0.015**		**0.120**	**0.051**	<0.005				<0.005
Apr-01	**0.110**	**0.110**	**0.120**	**0.012**	**0.010**	**0.016**	**0.088**	**0.032**	**0.044**				<0.005
Jul-01	**0.100**	**0.076**	**0.110**	**0.038**	**0.009**	**0.015**	**0.052**	**0.038**	**0.038**				<0.005
Jan-02	**0.110**	**0.100**	**0.130**		**0.009**	**0.027**		**0.053**	**0.044**				<0.005
Jul-02	**0.097**	**0.092**	**0.081**	**0.020**	**0.011**	**0.028**	**0.048**	**0.028**	**0.018**				<0.005
Jan-03	**0.120**	**0.067**	**0.130**	**0.030**	**0.022**	**0.015**	**0.017**	**0.009**					<0.005
Jul-03	**0.060**	**0.056**	**0.052**	<0.005	**0.019**	**0.053**	**0.047**	**0.031**	**0.042**				<0.005
Jan-04	**0.055**				**0.016**			**0.036**	**0.038**				<0.005
Jul-04	**0.057**	**0.069**	**0.062**	<0.005	**0.011**	**0.032**	**0.021**	<0.005	**0.018**				
Jan-05	**0.060**	**0.060**	**0.098**	<0.005	**0.017**	**0.035**	**0.016**	**0.019**	**0.014**				
Jul-05	**0.062**	**0.060**	**0.110**	**0.007**	**0.015**	**0.020**	**0.016**	**0.015**	**0.021**				
Jan-06	**0.027**	**0.042**	**0.075**	**0.013**	**0.026**	**0.036**	**0.025**	**0.036**	**0.016**				
Jul-06	<0.025		**0.081**	<0.025	<0.025	<0.025	**0.026**	**0.019**	<0.025				
Jan-07	**0.024**	**0.054**	**0.084**	**0.015**	**0.012**	**0.049**	**0.041**	**0.040**	**0.022**				
Jul-07	**0.016**	**0.097**	**0.061**	**0.017**	**0.010**			**0.045**	**0.028**				
Jan-08				**0.014**	**0.025**	**0.036**			**0.013**				<0.005
Jul-08	**0.011**	**0.046**	**0.030**	**0.018**	<0.005	**0.023**		**0.018**	**0.012**				<0.005
Jan-09	**0.010**	**0.044**	**0.031**	**0.012**	<0.005				**0.009**				
Jul-09	**0.010**	**0.041**	**0.026**	**0.012**	**0.005**			**0.021**	**0.018**				
Jul-10		**0.035**	**0.014**	**0.0037**	**0.0048**			**0.0041**	**0.0052**				<0.001
Jan-11	**0.044**	**0.068**	**0.01**		**0.034**			**0.029**	**0.011**				<0.005
Jul-11	**0.0034**		**0.014**	**0.0032**	**0.0016**				**0.0121**				<0.0002
Jan-12	**0.0021**	**0.026**	**0.0067**		**0.0106**	**0.0209**	**0.0737**	**0.0067**	**0.008**				
Jul-12													<0.00020
Jan-13	**0.00097**			**0.0014**		**0.0150**	**0.0601**	**0.0281**	**0.0101**				
Jul-13	**0.0010**			**0.0082**	**0.0340**	**0.0178**	**0.0472**	**0.0175**	**0.0052**				
Jan-14	**0.0011**				**0.0016**	**0.0339**	**0.0556**	**0.0249**					

SUPPLEMENTAL TABLE XI.B.[a]

BICA HISTORICAL RESULTS - 1,2-DICHLOROETHANE

Well >	RW-112	RW-141	RW-142	RW-144	RW-145	RW-146	RW-147	RW-194	RW-195	RW-106	RW-179	RW-192	MW-221
Constituent >	1,2-DCA	1,2-DCA	1,2-DCA	1,2-DCA	1,2-DCA	1,2-DCA	1,2-DCA	1,2-DCA	1,2-DCA	1,2-DCA	1,2-DCA	1,2-DCA	1,2-DCA
$^{GW}GW_{Class3}$ >	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l
Sat. Zone >	Sand & Gravel	Sand & Gravel	Sand & Gravel	Sand & Gravel	Sand & Gravel	Sand & Gravel	Sand & Gravel	Sand & Gravel	Sand & Gravel	U. Sand	U. Sand	U. Sand	U. Sand
Jul-14	0.0009			0.0041	0.0106	0.0145	0.0222	0.0181					
Mar-15	0.00072	<0.00035	0.0112	0.0023	<0.00035	0.0151	0.00066	<0.00035	<0.00035				
Jul-15	0.00068	0.0623	0.0067	<0.00035	0.00089	0.0177	0.008	0.0158	0.0088				
Jan-16	0.00077	0.0202	0.0047	0.0051	0.0075	0.0112	0.0098	0.0115	0.0073	<0.31			
Jul-16	0.0014	<0.00061	0.0029	<0.00061	<0.00061	0.0012	0.0153	0.0201	0.0177				
Jan-17	0..12	0.0447	0.0038	<0.00061	0.0073	0.0277	0.0273	0.0274	0.0172				
Jul-17	0..12	0.0447	0.0038	<0.00061	0.0073	0.0277	0.0273	0.0274	0.0172				
Jan-18	0.00094	0.0471	0.0035	<0.0003	0.001	0.0465	0.0015	0.0305	0.0085				
Jul-18	0.00067	0.041	0.0031	0.00093	<0.0004	0.0487	0.0219	0.0266	0.0225				
Jan-19	0.00079	0.00085	0.0013	<0.0004	<0.0004	0.0346	0.0146	0.0180	0.0153				
Jul-19	0.0024	0.0223	0.00072	<0.0004	<0.0004	0.0386	0.0146	0.0179	0.0163				
Jan-20	<0.00037	0.0436	0.0011	<0.00037	<0.00037	0.0306	0.0101	0.0112	0.0129				
Jul-20	<0.00037	0.026	0.0004	<0.00037	<0.00037	0.0276	<0.00037	0.0185	0.0212				
Jan-21	<0.00037	0.0154	0.00065	0.0147	<0.00037	0.0215	0.0015	0.0169	0.0173				
Jul-21	<0.00037	0.0141	0.00038	0.0163	<0.00037	0.0343	<0.00037	0.0380	0.0088	<0.073			
Jan-22	<0.00037	0.0703	0.00085	<0.00037	0.0019	0.0111	0.0654	0.0468	0.0067				
Jul-22	<0.00041	0.0579	0.00081	<0.00041	0.006	<0.00041	0.0488	0.0268	0.0044				
Jan-23	<0.00041	<0.00041	<0.00041	<0.00041	<0.00041	0.005	<0.00041	0.0341	0.0016				
Jul-23	<0.00041	0.0086	<0.00041	<0.00041	<0.00041	0.0176	0.0317	0.0341	0.0028				
Jan-24	0.0142	0.0462	0.00059	<0.00041	<0.00041	0.011	0.0266	0.0240	0.0010				
# DATA	52	44	47	48	53	45	43	51	51	2	0	0	21
# > MDL	40	40	45	26	37	43	40	48	47	0	0	0	0
# > PCL	0	0	0	0	1	0	0	0	0	0	0	0	0

<5.00	Less Than Method Detction Limit
5.00	Greater than Method Detection Limit but Less Than PCL
5.00	Greater than the PCL
BLANK	No Analysis for this event identified
	LNAPL Present at time of Sampling

SUPPLEMENTAL TABLE XI.B.[b]

BICA HISTORICAL RESULTS - ARSENIC

Well >	RW-112	RW-141	RW-142	RW-144	RW-145	RW-146	RW-147	RW-194	RW-195	RW-106	RW-179	RW-192	MW-221
Constituent >	Arsenic	Arsenic	Arsenic	Arsenic	Arsenic	Arsenic	Arsenic	Arsenic	Arsenic	Arsenic	Arsenic	Arsenic	Arsenic
$^{GW}GW_{Class3}$ >	1.0 mg/l	1.0 mg/l	1.0 mg/l	1.0 mg/l	1.0 mg/l	1.0 mg/l	1.0 mg/l	1.0 mg/l	1.0 mg/l	1.0 mg/l	1.0 mg/l	1.0 mg/l	1.0 mg/l
Sat. Zone >	Sand & Gravel	Sand & Gravel	Sand & Gravel	Sand & Gravel	Sand & Gravel	Sand & Gravel	Sand & Gravel	Sand & Gravel	Sand & Gravel	U. Sand	U. Sand	U. Sand	U. Sand
JUL-96	0.018				0.008								
JAN-97					0.008	<0.005	0.011	0.009	0.011				
JUL-97		0.12	0.017	0.009									
OCT-97	0.031	0.208	0.021	<0.005	0.018	<0.005	<0.005	<0.005	<0.005				
APR-98	<0.50	<0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50				<0.500
Oct-98	0.027	0.016	0.03	0.009	0.01	0.011	0.019	0.027	0.015				0.005
Jan-99													0.006
Apr-99	0.025	0.241	0.072	0.017	0.013	0.015	0.015	0.014	0.018				<0.005
Jul-99													<0.100
Oct-99	<0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				<0.01
Apr-00	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				<0.1
Oct-00	0.831	<0.5	<0.5	<0.5	<0.5		<0.5	<0.5	<0.5				<0.5
Apr-01	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5				<0.5
Jul-01	0.0245	1.13	0.0262	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02				<0.05
Jan-02	0.0394	1.33	0.0204		<0.02	<0.02		0.0206	<0.02				<0.02
Jul-02	0.04	0.05	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02				<0.02
Jan-03	0.0448	0.838	0.0301	0.0212	<0.02	<0.02	0.0244	<0.02					<0.02
Jul-03	0.104	0.0636	0.0285	0.021	<0.02	<0.02	<0.02	<0.02	<0.02				<0.02
Jan-04	0.0379				0.0223			<0.02	<0.02				<0.02
Jul-04	0.0383	0.826	0.0339	<0.02	0.0215	<0.02	<0.02	<0.02	<0.02				
Jan-05	0.021	0.434	0.0241	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02				
Jul-05	0.0383	1.3	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02				
Jan-06	<0.02	3.19	0.0251	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02				
Jul-06	0.0269		<0.02	<0.02	<0.02	<0.02	<0.02	<0.005	<0.02				
Jan-07	0.0273	0.0694	0.0435	0.02	<0.02	<0.02	<0.02	<0.02	<0.02				
Jul-07	0.053	0.068	<0.02	<0.02	<0.02			<0.02	<0.02				
Jul-08	0.0258	0.826	0.0306	<0.02	<0.02	<0.02		<0.02	<0.02				<0.02
Jan-09	0.0448	0.184	<0.02	<0.1	0.12				0.135				
Jan-13	0.03070			0.0104	0.0079	0.0128	0.0077	0.0067	0.0109				
Jul-13	0.02780			0.0083	<0.1	0.0072	0.0099	0.0081	0.0088				
Jan-14	0.02690				0.0096	0.0090	0.0124	0.0085					
Jul-14	0.03270			0.0081	0.0152	0.0337	0.0139	0.0108					
Mar-15	0.03320	0.0216	0.0803	0.0225	0.0213	0.0135	0.0117	0.0058	0.0100				
Jul-15	0.03330	0.0931	0.0333	0.0089	0.0092	0.0109	0.0177	0.0099	0.0089				
Jan-16	0.03250	0.0675	0.028	0.0037	0.0034	<0.0026	0.0175	0.0046	0.0048	0.0619			
Jul-16	0.02240	0.0191	0.0397	0.0075	0.0119	0.0068	0.0134	0.0101	0.0089				
Jan-17	0.03940	0.0319	0.0526	0.001	0.0112	0.0134	0.0205	0.0108	0.0084				
Jul-17	0.03940	0.0319	0.0526	0.001	0.0112	0.0134	0.0205	0.0108	0.0084				

SUPPLEMENTAL TABLE XI.B.[b]

BICA HISTORICAL RESULTS - ARSENIC

Well >	RW-112	RW-141	RW-142	RW-144	RW-145	RW-146	RW-147	RW-194	RW-195	RW-106	RW-179	RW-192	MW-221
Constituent >	Arsenic	Arsenic	Arsenic	Arsenic	Arsenic	Arsenic	Arsenic	Arsenic	Arsenic	Arsenic	Arsenic	Arsenic	Arsenic
$^{GW}GW_{Class3}$ >	1.0 mg/l	1.0 mg/l	1.0 mg/l	1.0 mg/l	1.0 mg/l	1.0 mg/l	1.0 mg/l	1.0 mg/l	1.0 mg/l	1.0 mg/l	1.0 mg/l	1.0 mg/l	1.0 mg/l
Sat. Zone >	Sand & Gravel	Sand & Gravel	Sand & Gravel	Sand & Gravel	Sand & Gravel	Sand & Gravel	Sand & Gravel	Sand & Gravel	Sand & Gravel	U. Sand	U. Sand	U. Sand	U. Sand
Jan-18	0.03190	0.0388	0.0342	0.0126	0.022	0.0155	0.0122	0.0119	0.0084				
Jul-18	0.02820	0.0447	0.0436	0.0094	0.0104	0.0133	0.0167	0.0103	0.0098				
Jan-19	0.15900	0.0208	0.0435	0.0125	0.0047	0.0141	0.0167	0.0184	0.0164				
Jul-19	0.28000	0.0642	0.0732	0.013	0.0065	0.0167	0.0312	0.0447	0.0152				
Jan-20	0.02530	0.165	0.0505	0.0081	0.0072	0.0102	0.41	0.0113	0.0079				
Jul-20	0.10100	<0.012	0.0707	0.0587	0.0958	<0.012	<0.012	<0.012	<0.012				
Jan-21	0.03430	0.021	0.0369	0.0069	0.0097	0.0094	0.0103	0.0110	0.0144				
Jul-21	0.04040	0.0492	0.0726	0.0084	0.0133	0.0122	0.0539	0.0147	0.0112	0.05090			
Jan-22	<0.00037	0.0703	0.00085	<0.00037	0.0019	0.0111	0.0654	0.0468	0.0067				
Jul-22	0.03740	0.119	0.0475	0.0151	0.0084	0.0134	0.0311	0.0257	0.0146				
Jan-23	0.03700	0.0281	0.0668	0.0152	0.011	0.0156	0.0053	0.0153	0.0087				
Jul-23	0.10000	0.0489	0.0298	0.0135	0.0144	0.0115	0.0262	0.0172	0.0084				
Jan-24	0.16400	0.0257	0.0257	0.0185	0.0168	0.0116	0.0327	0.0163	0.0086				
# DATA	47	40	42	44	48	43	42	46	44	2	0	0	16
# > MDL	41	35	33	27	30	23	26	26	24	2	0	0	2
# > PCL	0	4	0	0	0	0	0	0	0	0	0	0	0

<5.00	Less Than Method Detction Limit
5.00	Greater than Method Detection Limit but Less Than PCL
5.00	Greater than the PCL
BLANK	No Analysis for this event identified
	LNAPL Present at time of Sampling

SUPPLEMENTAL TABLE XI.B.[c]

BICA HISTORICAL RESULTS - BENZENE

Well >	MW-52	MW-52A	IW-58	IW-58A	MW-76	MW-76A	MW-78	MW-78A	MW-79	MW-79A	MW-80	MW-80A	RW-106	MW-109	MW-109A
Constituent >	Benzene	Benzene	Benzene	Benzene	Benzene	Benzene	Benzene	Benzene	Benzene	Benzene	Benzene	Benzene	Benzene	Benzene	Benzene
$^{GW}GW_{Class3}$ >	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l
Sat. Zone >	U. Sand	L. Gravel	U. Sand	L. Gravel	U. Sand	L. Gravel	U. Sand	L. Gravel	U. Sand	L. Gravel	U. Sand	L. Gravel	U. Sand	U. Sand	L. Gravel
OCT-90			0.007												
JUL-92	<0.001	<0.001	0.680		<0.001	<0.001	0.450	22.000	<0.005	1.200	<0.005	0.016			
MAR-93	<0.001	<0.001	0.830		<0.001	<0.001	0.860	24.000	<0.005	0.990	0.007	0.024		7.700	9.100
FEB-94	<0.001	<0.001	0.730		<0.001	<0.001	1.300	23.000	<0.005	0.720	0.005	0.014		9.900	11.000
JUL-94	<0.001	<0.001			<0.001	<0.001	16.000	21.000	<0.001	0.750	0.005	0.017		11.000	12.000
OCT-94							9.900	11.000	<0.001	0.850	0.003	0.012		7.200	8.800
DEC-94															
JAN-95	<0.001	<0.001			<0.001	<0.001	7.170	7.540	<0.001	0.630	0.011	0.084		5.280	5.600
APR-95							11.000	21.000	<0.005	1.100	0.003	0.022		7.200	11.000
JUL-95	<0.001	<0.001			<0.001	<0.001	6.200	6.300	<0.005	0.500	0.003	0.023		3.600	5.100
OCT-95							3.200	3.500		0.450				0.940	1.890
JAN-96	<0.001	<0.001			<0.001	<0.001	4.060	11.300	<0.005	0.850	<0.005	<0.005		0.215	1.100
JUL-96	<0.001	<0.001			<0.001	<0.001	0.450	13.900	<0.005	0.660	<0.005	<0.025		0.276	0.300
JAN-97	<0.001	<0.001			<0.001	<0.001	0.210	26.000	<0.005	0.760	0.012	0.015		0.180	0.200
APR-97															
JUL-97	<0.001	<0.001			<0.001	<0.001	17.600	22.000	DRY	0.700	0.150	2.700		1.350	0.740
OCT-97							17.600	22.000	DRY	0.700	0.082				
JAN-98	<0.001	<0.001			<0.001	<0.001	32.000	23.000	DRY	0.400	0.820	3.400		0.170	0.510
APR-98							32.000	23.000	DRY	0.400	0.150				
JUL-98	<0.001	<0.001			<0.001	<0.001									
Oct-98							8.800	12.000	DRY	0.077	0.390	5.600		0.007	0.006
Jan-99	<0.001	<0.001			<0.001	<0.001									
Apr-99							1.300	5.000	DRY	0.420	0.120	13.000		0.001	0.002
Jul-99	<0.001	<0.001			<0.001	<0.001									
Oct-99							0.015	0.500	DRY	0.270	0.140	17.000		<0.001	<0.001
Jan-00	<0.001	<0.001			<0.001	<0.001									
Apr-00							<0.001	0.110	DRY	0.060	0.036	0.560		<0.001	<0.001
Jul-00	<0.001	<0.001			<0.001	<0.001									
Oct-00							0.005	0.005	DRY	0.016	0.036	0.180		0.001	0.001
Jan-01	<0.001	<0.001			<0.001	<0.001									
Apr-01							<0.001	0.070		0.120	0.093	1.7		<0.001	<0.001
Jul-01	<0.001	<0.001			<0.001	<0.001	0.001	0.003		1.100	0.039	0.078		<0.001	<0.001
Jan-02	<0.001	<0.001			<0.001	<0.001	<0.001	<0.001		0.600	0.011	0.015		<0.001	<0.001
Jul-02	<0.001	<0.001			<0.001	<0.001	<0.001	0.001		0.390	0.006	0.009		<0.001	<0.001
Jan-03	<0.001	<0.001			<0.001	<0.001	<0.001	<0.001		0.066	0.008	0.004		<0.001	<0.001
Jul-03	<0.001	<0.001			<0.001	<0.001	<0.001	<0.001		0.580	0.004	0.003		<0.001	<0.001
Jan-04	<0.001	<0.001			<0.001	<0.001	0.002	0.001		0.010	0.004	0.002		<0.001	<0.001
Jul-04	<0.001	<0.001			<0.001	<0.001	<0.001	<0.001		0.004	0.004	<0.001		<0.001	<0.001
Jan-05	<0.001	<0.001			<0.001	<0.001	<0.001	<0.001	<0.001	0.034	0.004	<0.001		<0.001	<0.001
Apr-05															
Jul-05	<0.001	<0.001			<0.001	<0.001	<0.001	<0.001	<0.001	0.002	0.002	<0.001		<0.001	<0.001
Jan-06	<0.001	<0.001			<0.001	<0.001	<0.001	<0.001	<0.001	0.002	0.001	<0.001		<0.001	<0.001
Jul-06	<0.001	<0.001			<0.001	<0.001	<0.001	<0.001	<0.001	0.001	0.001	<0.001		<0.001	<0.001
Jan-07	<0.001	<0.001			<0.001	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.001		<0.001	<0.001
Mar-07															
May-07														<0.005	<0.005
Jul-07	<0.001	<0.001			<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		<0.001	<0.001
Jan-08	<0.005	<0.005			<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005		<0.005	<0.005
Jul-08	<0.005	<0.005			<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005		<0.005	<0.005
Oct-08			<0.001	0.003						<0.001	<0.001				
Jan-09	<0.001	<0.001			<0.001	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.001		<0.001	<0.001

SUPPLEMENTAL TABLE XI.B.[c]

BICA HISTORICAL RESULTS - BENZENE

Well >	RW-112	MW-125	MW-125A	RW-141	RW-142	RW-144	RW-145	RW-146	RW-147	IW-149	IW-149A	IW-150	IW-150A	MW-152	MW-152A
Constituent >	Benzene	Benzene	Benzene	Benzene	Benzene	Benzene	Benzene	Benzene	Benzene	Benzene	Benzene	Benzene	Benzene	Benzene	Benzene
$^{GW}GW_{Class3}$ >	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l
Sat. Zone >	Sand & Gravel	U. Sand	L. Gravel	Sand & Gravel	Sand & Gravel	Sand & Gravel	Sand & Gravel	Sand & Gravel	Sand & Gravel	U. Sand	L. Gravel	U. Sand	L. Gravel	U. Sand	L. Gravel
OCT-90															
JUL-92															
MAR-93															
FEB-94		1.800	1.500							0.079	0.083	<0.001	0.001		
JUL-94															
OCT-94	12.000														
DEC-94															
JAN-95	8.470						0.002								
APR-95	11.000	0.240	3.300				0.049							<0.001	33.000
JUL-95	9.900	0.142	0.151				0.055			0.008	0.022	<0.001	<0.001	0.002	0.541
OCT-95		0.209	4.700							0.008	0.011	<0.001	<0.001	<0.005	0.440
JAN-96	3.720	<0.005	<0.005				0.039			0.003	0.024	<0.001	<0.001	<0.005	0.420
JUL-96		0.515	0.548				0.038			0.010	0.009	0.002	0.002	<0.005	<0.005
JAN-97	1.600	<0.005	<0.005	0.008	0.370	0.230	0.035	0.075	0.037	0.003	0.015	0.002	0.001	<0.005	1.400
APR-97															
JUL-97	4.290	<0.005	0.337	0.007	0.165	0.160	0.013	0.098	0.060	0.005	0.031	<0.001	<0.001	<0.005	2.600
OCT-97				0.007	0.165	0.160	<0.005	0.098	0.060	0.005	0.031	<0.001	<0.001	<0.001	2.600
JAN-98	10.000														
APR-98		0.012	0.082	0.019	0.140	0.450	1.700	0.057	0.160	0.003	0.010	<0.001	0.001	<0.001	<0.005
JUL-98															
Oct-98	7.100	<0.001	<0.001	0.002	4.300	0.005	0.002	0.047	0.015	0.038	0.053	<0.001	0.001	<0.001	4.600
Jan-99															
Apr-99	6.700	<0.001	<0.001	0.002	0.630	0.700	0.024	0.013	0.140	0.012	0.011	0.002	0.001	0.002	0.310
Jul-99															
Oct-99	5.900	<0.001	<0.001		2.000	0.049	0.003	0.050	0.340	0.007	0.049	<0.001	<0.001	<0.001	1.100
Jan-00															
Apr-00	2.900	<0.001	<0.001	0.002	0.750	0.003	0.014	0.120	0.360	0.008	0.028	<0.001	<0.001	<0.001	0.003
Jul-00															
Oct-00	0.940	<0.001	<0.001	<0.001	0.350	0.061	0.020		0.400	0.041	0.041	<0.001	<0.001	<0.001	<0.001
Jan-01															
Apr-01	0.700	<0.001	<0.001	<0.001	0.011	0.390	0.020	0.014	0.670	0.025	0.040	<0.001	<0.001	0.004	<0.001
Jul-01	0.011	<0.001	<0.001	<0.001	0.012	0.046	0.021	0.043	0.370	0.039	0.085	<0.001	<0.001	<0.001	<0.001
Jan-02	0.082	<0.001	<0.001	<0.001	0.005		0.001	0.041		0.013	0.008	<0.001	<0.001	<0.001	0.003
Jul-02	0.021	<0.001	<0.001	<0.001	0.002	0.110	<0.001	0.042	0.230	0.130	0.160	<0.001	<0.001	<0.001	0.009
Jan-03	0.150	<0.001	<0.001	0.001	0.004	0.180	0.008	0.010	0.140	0.019	0.013	<0.001	<0.001	<0.001	0.002
Jul-03	0.006	<0.001	<0.001	<0.001	0.007	0.001	0.002	0.096	0.340	0.160	0.130	<0.001	<0.001	0.040	<0.001
Jan-04	0.014	<0.001	<0.001				0.008			0.200	0.160	<0.001	<0.001	4.700	<0.001
Jul-04	<0.001	<0.001	<0.001	<0.001	<0.005	0.013	<0.001	0.036	0.024	0.180	0.160	<0.001	<0.001	35.000	0.004
Jan-05	<0.001	<0.001	<0.001	<0.001	<0.001	0.013	0.088	0.230	0.033	0.190	0.170	<0.001	<0.001	2.200	<0.001
Apr-05															
Jul-05	<0.001	<0.001	<0.001	<0.001	<0.001	0.045	0.099	0.100	0.170	0.510	0.480	<0.001	<0.001	7.600	0.001
Jan-06	<0.001	<0.001	<0.001	<0.001	<0.001	0.190	0.360	0.430	0.170	0.680	0.630	<0.001	<0.001	29.000	<0.001
Jul-06	<0.005	<0.001	<0.001		<0.005	0.043	0.013	0.490	0.091	0.770	0.760	<0.001	<0.001	45.000	<0.001
Jan-07	<0.001	<0.001	<0.001	<0.001	<0.001	0.170	0.001	0.200	0.330	0.660	0.640	<0.001	<0.001	40.000	<0.001
Mar-07															
May-07										0.580	0.480	<0.005	<0.005		
Jul-07	<0.001	<0.001	<0.001	<0.001	<0.001	0.020	0.0020			0.58	0.51	<0.001	<0.001	46	<0.001
Jan-08		<0.005	<0.005			0.360	0.170	0.120		0.640	0.540	<0.005	<0.005	92.000	0.005
Jul-08	<0.001	0.051	0.008	<0.001	<0.001	<0.005	<0.005	0.170		0.630	0.580	<0.005	<0.005	100.000	29.000
Oct-08										0.900	0.810			180.000	0.230
Jan-09	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001			1.200	1.000	<0.001		125.000	<0.001

SUPPLEMENTAL TABLE XI.B.[c]

BICA HISTORICAL RESULTS - BENZENE

Well >	MW-153	MW-153A	MW-154	MW-154A	MW-155	MW-155A	MW-163	MW-163A	MW-165R	MW-165AR	MW-166	MW-166A	RW-173	RW-174
Constituent >	Benzene	Benzene	Benzene	Benzene	Benzene	Benzene	Benzene	Benzene	Benzene	Benzene	Benzene	Benzene	Benzene	Benzene
$^{GW}GW_{Class3}$ >	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l
Sat. Zone >	U. Sand	L. Gravel	U. Sand	L. Gravel	U. Sand	L. Gravel	U. Sand	L. Gravel	U. Sand	L. Gravel	U. Sand	L. Gravel	U. Sand	U. Sand
OCT-90														
JUL-92														
MAR-93														
FEB-94														
JUL-94	0.004	0.004		0.006										
OCT-94														
DEC-94					<0.001	0.028								
JAN-95														
APR-95	<0.001	<0.001	<0.001	0.015	<0.001	0.120	0.004	0.003	<0.001	<0.001	<0.001	<0.001		
JUL-95	0.005	0.004	<0.001	0.017	<0.001	0.014	0.030	0.006	<0.001	<0.001	<0.001	<0.001		
OCT-95	<0.005	<0.005	<0.005	<0.02	<0.001	0.007	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001		
JAN-96	<0.005	<0.005	<0.001	0.007	<0.001	0.002	0.001	0.006	<0.001	<0.001	<0.001	<0.001		
JUL-96	<0.005	2.173	<0.001	0.006	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001		
JAN-97	<0.005	<0.005	<0.001	0.005	<0.001	<0.001	<0.001	0.002	<0.001	<0.001	<0.001	<0.001		
APR-97														
JUL-97	<0.005	<0.005	<0.001	0.007	<0.001	<0.001	<0.001	0.005	<0.001	<0.001	<0.001	<0.001		
OCT-97	<0.005	<0.005	<0.001	0.007	<0.001	<0.001	<0.001	0.005	<0.001	<0.001	<0.001	<0.001		
JAN-98									<0.001	<0.001	<0.001	<0.001		
APR-98	<0.005	<0.001	<0.001	0.004	<0.001	0.009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		
JUL-98									<0.001	<0.001	<0.001	<0.001		
Oct-98	0.007	0.004	<0.001	0.005	<0.001	0.015	<0.001	0.002	<0.001	<0.001	<0.001	<0.001		
Jan-99									<0.001	<0.001	<0.001	<0.001		
Apr-99	0.007	0.005	<0.001	0.003	<0.001	0.002	<0.001	0.002	<0.001	<0.001	<0.001	<0.001		
Jul-99									<0.001	<0.001	<0.001	<0.001		
Oct-99	0.013	0.010	<0.001	0.003	<0.001	<0.001	<0.001	0.002	<0.001	<0.001	<0.001	<0.001		
Jan-00									<0.001	<0.001	<0.001	<0.001		
Apr-00	0.009	0.005	<0.001	<0.001	<0.001	0.007	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		
Jul-00									<0.001	<0.001	<0.001	<0.001		
Oct-00	0.018	0.010	<0.001	0.001	<0.001	0.018	<0.001	0.002	0.009	<0.001	<0.001	<0.001		
Jan-01									<0.001	<0.001	<0.001	<0.001		
Apr-01	<0.001	0.012	<0.001	0.003	<0.001	0.039	<0.001	0.001	<0.001	<0.001	<0.001	<0.001		
Jul-01	0.023	0.019		0.002	<0.001	0.050	<0.001	0.001	<0.001	<0.001	<0.001	<0.001		
Jan-02	0.016	0.012		0.002	<0.001	0.054	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		
Jul-02	0.023	0.017		0.005	<0.001	0.058	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		
Jan-03	0.029	0.023		0.004	<0.001	0.067	0.001	0.002	<0.001	<0.001	<0.001	<0.001		
Jul-03	0.029	0.027		0.001	<0.001	0.054	<0.001	0.002	<0.001	<0.001	<0.001	<0.001	24.000	
Jan-04	0.026	0.020		0.004	<0.001	0.053	<0.001	0.001	<0.001	<0.001	<0.001	<0.001		
Jul-04	0.030	0.032		0.005	0.001	0.056	<0.001	0.003	0.003	0.003	<0.001	<0.001		
Jan-05	0.022	0.023		0.005	<0.001	0.059	<0.001	0.009	<0.001	<0.001	<0.001	<0.001		
Apr-05														95.000
Jul-05	0.026	0.019		0.006	<0.001	0.061	<0.001	0.008	<0.001	<0.001	<0.001	<0.001		
Jan-06	0.031	0.020		0.005	<0.001	0.110	<0.001	0.008	<0.001	<0.001	<0.001	<0.001		
Jul-06	0.035	0.031	<0.001	0.004	<0.001	0.160	<0.001	0.005	<0.001	<0.001	<0.001	<0.001		
Jan-07	0.032	0.027		0.005	<0.001	0.083	<0.001	0.004	<0.001	<0.001	<0.001	<0.001		
Mar-07					<0.005	0.084								
May-07			<0.005	<0.005	<0.005	0.091	<0.005	0.005	<0.005	<0.005	<0.005	<0.005		
Jul-07	0.028	0.024		0.0040	<0.001	0.10	<0.001	0.0060	<0.001	<0.001	<0.001	<0.001		
Jan-08	0.026	0.021		<0.005	<0.001	0.610	<0.005	0.009	<0.001	<0.001	<0.001	<0.001		
Jul-08	0.031	0.027		<0.005	<0.005	0.540	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	17.000	
Oct-08						0.510								
Jan-09	0.037	0.037	<0.001	<0.001	<0.001	0.520	<0.001	0.005	<0.001	<0.001	<0.001	<0.001		

SUPPLEMENTAL TABLE XI.B.[c]

BICA HISTORICAL RESULTS - BENZENE

Well >	RW-175	RW-177	RW-178	RW-179	RW-185	RW-192	RW-194	RW-195	MW-214	MW-214A	MW-215	MW-215A	MW-218	MW-218A	MW-220
Constituent >	Benzene	Benzene	Benzene	Benzene	Benzene	Benzene	Benzene	Benzene	Benzene	Benzene	Benzene	Benzene	Benzene	Benzene	Benzene
$^{GW}GW_{Class3}$ >	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l
Sat. Zone >	U. Sand	U. Sand	U. Sand	U. Sand	U. Sand	U. Sand	Sand & Gravel	Sand & Gravel	U. Sand	L. Gravel	U. Sand	L. Gravel	U. Sand	L. Gravel	U. Sand
OCT-90															
JUL-92															
MAR-93															
FEB-94															
JUL-94															
OCT-94															
DEC-94															
JAN-95															
APR-95															
JUL-95															
OCT-95															
JAN-96															
JUL-96															
JAN-97						0.062	0.260								
APR-97	0.062									<0.001	<0.001		<0.001	<0.001	
JUL-97	0.018					0.018	0.370	<0.005	<0.005						
OCT-97						0.028	0.370	<0.001	<0.001	<0.001	<0.001		<0.001	<0.001	
JAN-98										<0.001	<0.001		<0.001	<0.001	
APR-98						0.140	1.200	<0.001	<0.001	<0.001	<0.001		<0.001	<0.001	<0.005
JUL-98										<0.001	<0.001		<0.001	0.060	
Oct-98						0.044	0.180	<0.001	0.002	0.001	0.001		<0.001	0.050	0.001
Jan-99								<0.001	0.002	<0.001	0.002	<0.001	<0.001	0.059	<0.001
Apr-99						0.100	0.043	<0.001	0.002	0.003	0.003	0.001	0.001	0.051	<0.001
Jul-99								<0.001	0.002			<0.001			<0.001
Oct-99						0.088	0.520	<0.001	0.002	0.002	0.001	0.094	<0.001	0.058	<0.001
Jan-00										0.002	0.001		<0.001	0.024	
Apr-00						0.320	0.470	<0.001	<0.001	0.004	<0.001		<0.001	0.015	<0.001
Jul-00										0.003	0.001		<0.001	0.059	
Oct-00						0.290	0.007	<0.001	0.003	0.003	0.001	<0.001	<0.001	0.036	<0.001
Jan-01										0.002	<0.001		<0.001	0.042	
Apr-01						0.460	0.020	<0.001	<0.001	0.004	0.001	<0.01	<0.001	0.019	<0.001
Jul-01						0.300	0.049	<0.001	0.002	0.005	0.001		<0.001	0.021	<0.001
Jan-02						0.490	0.006	<0.001	0.002	0.004	<0.001		<0.001	0.028	<0.001
Jul-02						0.091	0.033	0.001	0.002	0.004	0.002		<0.001	0.012	<0.001
Jan-03						0.044		<0.001	0.004	0.006	<0.001		<0.001	0.045	0.001
Jul-03						0.130	0.051	<0.001	0.006	0.004	<0.001		<0.001	0.040	<0.001
Jan-04						0.093	0.001	0.003	0.003	0.006	0.002		<0.001	0.038	0.002
Jul-04						0.250	0.180	0.002	0.002	0.005	0.003		0.002	0.041	0.002
Jan-05						0.007	0.200	<0.001	<0.001	0.002	<0.001		<0.001	0.047	<0.001
Apr-05															
Jul-05						0.130	0.290	<0.001	0.002	0.002	<0.001		<0.001	0.052	0.001
Jan-06						0.360	0.270	<0.001	0.002	0.002	<0.001		<0.001	0.058	<0.001
Jul-06						0.073	0.540	<0.001	0.001	0.001	<0.001		<0.001	0.055	<0.001
Jan-07						0.280	0.100	<0.001	<0.001	0.001	<0.001		<0.001	0.064	<0.001
Mar-07												<0.005	<0.005	0.064	
May-07										<0.005	<0.005	<0.005	<0.005	0.066	
Jul-07						0.38	0.036	<0.001	<0.001	0.0020	<0.001		<0.001	0.054	<0.001
Jan-08							0.320	<0.005	<0.005	<0.005	<0.005		<0.005	0.064	<0.005
Jul-08						0.059	0.300	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.076	<0.005
Oct-08															
Jan-09							0.130	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	0.031111	<0.001

SUPPLEMENTAL TABLE XI.B.[c]

BICA HISTORICAL RESULTS - BENZENE

Well >	MW-220A	MW-221	MW-221A	MW-223	MW-223A	MW-224	MW-224A	MW-225	MW-225A	MW-227	MW-227A	RW-228
Constituent >	Benzene	Benzene	Benzene	Benzene	Benzene	Benzene	Benzene	Benzene	Benzene	Benzene	Benzene	Benzene
$^{GW}GW_{Class3}$ >	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l
Sat. Zone >	L. Gravel	U. Sand	L. Gravel	U. Sand	L. Gravel	U. Sand	L. Gravel	U. Sand	L. Gravel	U. Sand	L. Gravel	U. Sand
OCT-90												
JUL-92												
MAR-93												
FEB-94												
JUL-94												
OCT-94												
DEC-94												
JAN-95												
APR-95												
JUL-95												
OCT-95												
JAN-96												
JUL-96												
JAN-97												
APR-97												
JUL-97												
OCT-97												
JAN-98												
APR-98	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	**0.007**	<0.005	**0.093**	
JUL-98												
Oct-98	**0.001**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**0.021**	<0.001	**0.097**	
Jan-99	**0.001**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**0.031**	<0.001	**0.110**	
Apr-99	**0.001**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**0.001**	**0.009**	<0.001	**0.075**	
Jul-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**0.015**	<0.001	**0.120**	
Oct-99	**0.001**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**0.045**	<0.001	**0.120**	
Jan-00												
Apr-00	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**0.008**	**<0.001**	**0.095**	
Jul-00												
Oct-00	**0.001**	**0.001**	<0.001	<0.001	<0.001	**0.002**	**0.003**	<0.001	**0.002**	<0.001	**0.120**	
Jan-01												
Apr-01	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**0.012**	<0.001	**0.130**	
Jul-01	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**0.001**	**0.027**	<0.001	**0.120**	
Jan-02	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**0.011**	<0.001	**0.110**	
Jul-02	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**0.039**	**0.001**	**0.110**	
Jan-03	<0.001	**0.002**	**0.001**	<0.001	<0.001	<0.001	<0.001	<0.001	**0.058**	**0.002**	**0.130**	
Jul-03	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**0.059**	**0.001**	**0.120**	
Jan-04	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**0.022**	**0.001**	**0.120**	
Jul-04	**0.002**		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**0.030**	**0.002**	**0.079**	
Jan-05	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**0.016**	**0.003**	**0.090**	
Apr-05												
Jul-05	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**0.038**	**0.006**	**0.064**	
Jan-06	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**0.032**	**0.005**	**0.058**	
Jul-06	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**0.038**	**0.008**	**0.066**	
Jan-07	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**0.008**	**0.009**	**0.064**	
Mar-07												
May-07												
Jul-07	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**0.016**	**0.010**	**0.058**	
Jan-08	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	**0.013**	**0.048**	
Jul-08	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	**0.013**	**0.049**	
Oct-08												
Jan-09	<0.001	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001	**0.002**	**0.017**	**0.059**	

SUPPLEMENTAL TABLE XI.B.[c]

BICA HISTORICAL RESULTS - BENZENE

Well >	MW-52	MW-52A	IW-58	IW-58A	MW-76	MW-76A	MW-78	MW-78A	MW-79	MW-79A	MW-80	MW-80A	RW-106	MW-109	MW-109A
Constituent >	Benzene	Benzene	Benzene	Benzene	Benzene	Benzene	Benzene	Benzene	Benzene	Benzene	Benzene	Benzene	Benzene	Benzene	Benzene
$^{GW}GW_{Class3}$ >	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l
Sat. Zone >	U. Sand	L. Gravel	U. Sand	L. Gravel	U. Sand	L. Gravel	U. Sand	L. Gravel	U. Sand	L. Gravel	U. Sand	L. Gravel	U. Sand	U. Sand	L. Gravel
Jul-09	<0.001	<0.001			<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		<0.001	<0.001
Jan-10	<0.001	<0.001			<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		<0.001	<0.001
Jul-10	<0.001	<0.001			<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		<0.001	<0.001
Jan-11	<0.001	<0.001			<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		<0.001	<0.001
Jul-11	<0.00025	<0.00025			<0.001	<0.00025	0.00039	<0.00025	<0.001	<0.00025	<0.00025	<0.00025		<0.00025	<0.00025
Jan-12	<0.00025				<0.00025	<0.00025	<0.0010	<0.00025	**0.0292**	<0.00025	<0.00025	<0.00025		**0.00039**	**0.00039**
Jul-12	<0.001	<0.001				<0.001	**0.00028**	<0.00025	<0.00025	0.00031	<0.00025	<0.00025		<0.00025	<0.00025
Jan-13	<0.00034	<0.00034			**0.004**	<0.00034	<0.00034	<0.00034	<0.00034	**0.0016**	<0.00034	<0.00034		<0.00034	<0.00034
Jul-13	<0.001	<0.001			<0.001	<0.001	**0.00048**	<0.00034	<0.00034	<0.00034	<0.0034	<0.00034		<0.00034	<0.00034
Jan-14	**0.00041**	**0.00041**			**0.00041**	**0.00043**	**0.00039**	<0.00034	<0.00034	<0.00034	<0.00034	<0.00034		<0.00034	<0.00034
Jul-14	<0.001	<0.001			<0.001	<0.001	<0.00034	<0.00034	<0.0034	<0.00034	<0.00034	<0.00034		<0.00034	<0.00034
Mar-15	<0.00034	<0.00034			<0.00034	<0.00034	<0.00034	<0.00034	<0.00034	<0.00034	<0.00034	<0.00034		<0.00034	<0.00034
Jul-15	<0.00034	<0.00034	**0.853**	<0.00034	<0.00034	<0.00034	<0.00034	<0.00034	<0.00034	<0.00034	<0.00034	<0.00034		<0.00034	<0.00034
Jan-16	<0.00047	<0.00047	<0.00047	0.0019	<0.00047	<0.00047	<0.00047	<0.00047	<0.00047	<0.00047	<0.00047	<0.00047	**25.700**	<0.00047	<0.00047
Jul-16	<0.00047	<0.00047	<0.00047	0.0011	<0.00047	<0.00047	<0.00047	<0.00047	<0.00047	<0.00047	<0.00047	<0.00047		<0.00047	<0.00047
Jan-17	<0.00047	<0.00047	0.0141	<0.00047	<0.00047	<0.00047	<0.00047	<0.00047	<0.00047	**0.00095**	<0.00047	<0.00047		<0.00047	<0.00047
Jul-17	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	0.00044	<0.0003	<0.0003	**0.0026**	<0.0003	<0.0003		<0.0003	<0.0003
Jan-18	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	**0.0065**	<0.0003	<0.0003		<0.0003	<0.0003
Jul-18	<0.0004	<0.0004	0.0287	<0.0004	<0.0004	<0.0004	0.00064	<0.0004	<0.0004	**0.0022**	<0.0004	<0.0004		<0.0004	<0.0004
Jan-19	<0.0004	<0.0004	**1.29**	**4.23**	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	**0.0051**	<0.0004	<0.0004		<0.0004	<0.0004
Jul-19	<0.0004	<0.0004	**0.132**	**0.258**	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004		<0.0004	<0.0004
Jan-20	<0.0003	<0.0003	**0.058**	**0.0021**	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003		<0.0003	<0.0003
Jul-20	<0.003	<0.0003	**0.00084**	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	**0.00062**	<0.0003	**0.0003**		<0.0003	<0.0003
Jan-21	<0.0003	<0.0003	**0.001**	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	**0.0008**	<0.0003	<0.0003		<0.0003	<0.0003
Jul-21	<0.0003	<0.0003	**0.0370**	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	**32.4000**	<0.0003	<0.0003
Jan-22	<0.0003	<0.0003	**0.00041**	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.015	**0.0427**	<0.0003	<0.0003		<0.0003	<0.0003
Jul-22	<0.00023	<0.00023	**0.0648**	<0.00023	<0.00023	<0.00023	<0.00023	<0.00023	<0.00023	**0.0006**	<0.00023	<0.00023		<0.00023	<0.00023
Jan-23	<0.00023	<0.00023	**0.0134**	<0.00023	<0.00023	<0.00023	<0.00023	<0.00023	<0.00023	**0.842**	<0.00023	**0.0023**		<0.00023	<0.00023
Jul-23	<0.00023	<0.00023	<0.00023	<0.00023	<0.00023	<0.00023	<0.00023	<0.00023	0.00091	**0.002**	<0.00023	<0.00023		<0.00023	<0.00023
Jan-24	<0.00023	<0.00023	<0.00023	<0.00023	<0.00023	<0.00023	**0.00096**	<0.00023	<0.00023	**0.0014**	<0.00023	<0.00023		<0.00023	<0.00023
# DATA	63	62	23	19	62	63	68	68	59	69	68	65	2	66	66
# > MDL	1	1	16	6	2	1	29	25	2	49	29	25	2	17	17
# > PCL	0	0	5	1	0	0	15	18	0	16	1	7	2	9	11

<5.00	Less Than Method Detction Limit
5.00	Greater than Method Detection Limit but Less Than PCL
5.00	Greater than the PCL
BLANK	No Analysis for this event identified
	LNAPL Present at time of Sampling

SUPPLEMENTAL TABLE XI.B.[c]

BICA HISTORICAL RESULTS - BENZENE

Well >	RW-112	MW-125	MW-125A	RW-141	RW-142	RW-144	RW-145	RW-146	RW-147	IW-149	IW-149A	IW-150	IW-150A	MW-152	MW-152A
Constituent >	Benzene	Benzene	Benzene	Benzene	Benzene	Benzene	Benzene	Benzene	Benzene	Benzene	Benzene	Benzene	Benzene	Benzene	Benzene
$^{GW}GW_{Class3}$ >	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l
Sat. Zone >	Sand & Gravel	U. Sand	L. Gravel	Sand & Gravel	Sand & Gravel	Sand & Gravel	Sand & Gravel	Sand & Gravel	Sand & Gravel	U. Sand	L. Gravel	U. Sand	L. Gravel	U. Sand	L. Gravel
Jul-09	<0.001	<0.001	<0.001	<0.001	<0.001	**0.0011**	<0.001			**1.2**	**1.2**	<0.001	<0.001	**140.000**	<0.001
Jan-10		<0.001	<0.001							**1.200**	**1.400**	<0.001	<0.001	**69.000**	**0.008**
Jul-10		<0.001	<0.001	<0.001	<0.001	**0.002**	**0.002**			**1.200**	**1.700**	<0.001	<0.001	**180.000**	**0.009**
Jan-11	<0.001	<0.001	<0.001	<0.001	<0.001		**0.082**			**0.860**	**1.300**	<0.001	<0.001	**140.000**	<0.001
Jul-11	<0.00025	<0.00025	<0.00025		<0.00025	**0.0155**	**0.00032**			**0.987**	**1.330**	<0.00025	<0.00025	**96.000**	**0.0706**
Jan-12	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025		<0.00025	**0.0244**	**0.0089**			**0.00063**	**0.00064**	**37.800**	**0.0855**
Jul-12		<0.00025	**0.0003**							**0.2**	**1.720**	**0.00036**	**0.00025**	**29.500**	**0.0435**
Jan-13	<0.001	**0.00250**	<0.00034			<0.001	**0.0021**	<0.001	<0.001	**0.0237**	**2.310**	<0.00034	<0.00034		**0.0272**
Jul-13	<0.00034	<0.00034	<0.00034			<0.00034	**0.0820**	**0.0154**	**0.0202**	**0.0018**	**2.240**	<0.00034	<0.00034	**65.500**	**0.0513**
Jan-14	<0.00034	<0.00034	<0.00034				**0.0003**	**0.1040**	**0.2240**	**0.0043**	**1.800**	<0.00034	<0.00034	**151.000**	**0.0615**
Jul-14	<0.00034	<0.00034	<0.00034			<0.00034	<0.00025	**0.0032**	**0.0205**	**0.0081**	**1.640**	<0.00034	<0.00034	**245.000**	**0.0803**
Mar-15	<0.00034	<0.00034	<0.00034	<0.00034	<0.00034	0.00089	<0.00034	**0.0016**	<0.00034	**0.0021**	<0.00034	<0.00034	**0.0536**	**335.000**	**0.0091**
Jul-15	<0.00034	<0.00034	<0.00034	<0.00034	<0.00034	<0.00034	**0.0055**	<0.00034	**0.00069**	**0.0333**	**1.400**	<0.00034	<0.00034		**0.0763**
Jan-16	<0.00047	<0.00047	<0.00047	<0.00047	<0.00047	<0.00047	0.0509	0.0033	<0.00047	**0.0261**	**2.020**	<0.00047	<0.00047		**0.0014**
Jul-16	<0.00047	<0.00047	<0.00047	<0.00047	<0.00047	<0.00047	<0.00047	<0.00047	0.0057	**0.0014**	**1.890**	<0.00047	<0.00047		<0.00047
Jan-17	<0.00047	<0.00047	<0.00047	<0.00047	<0.00047	<0.00047	**0.0131**	<0.00047	<0.00047	**0.0007**	**1.780**	<0.00047	<0.00047		<0.00047
Jul-17	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	0.0031	<0.0003	<0.0003	**0.0008**	**1.750**	<0.0003	<0.0003		<0.0003
Jan-18	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	**0.00069**	**0.0049**	**0.714**	<0.0003	<0.0003		<0.0003
Jul-18	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	**0.0185**	**0.0018**	**0.4510**	<0.0004	<0.0004		**0.0772**
Jan-19	**0.00075**	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	**0.0028**	<0.0004	**0.112**	<0.0004	<0.0004		**0.5750**
Jul-19	**0.00068**	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	**0.0041**	**0.078**	<0.0004	<0.0004		<0.0004
Jan-20	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	**0.0460**	<0.0003	<0.0003		<0.0003
Jul-20	**0.0011**	<0.0003	<0.0003	<0.0003	<0.0003	<0.00030	<0.0003	<0.0003	0.00049	<0.0003	**0.1910**	<0.0003	<0.0003		<0.0003
Jan-21	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.00030	<0.00030	<0.0003	<0.0003	**0.0013**	<0.0003	<0.0003		<0.0003
Jul-21	<0.0003	<0.0003	<0.0003	<0.00030	<0.00030	<0.00030	**0.0012**	<0.00030	**0.0005**	<0.0003	**0.0043**	<0.0003	<0.0003		<0.0003
Jan-22	<0.00030	<0.0003	<0.0003	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	**0.0006**	**0.0302**	**0.0004**	<0.0003		<0.0003
Jul-22	<0.00023	<0.00023	<0.00023	<0.00023	<0.00023	<0.00023	<0.0011	<0.00023	<0.0045	<0.00023	**0.0006**	<0.00023	<0.00023		<0.00023
Jan-23	<0.00023	<0.00023	<0.00023	<0.00023	<0.00023	<0.00023	<0.00023	<0.00023	<0.00023	<0.0011	<0.0011	<0.0023	<0.0045		<0.00023
Jul-23	<0.00023	<0.00023	<0.00023	<0.00023	<0.00023	<0.00023	<0.00023	<0.00023	0.00038	<0.0011	<0.0011	<0.0023	<0.0045		<0.00023
Jan-24	**0.00053**	<0.00023	<0.00023	<0.00023	<0.00023	<0.00023	<0.00023	<0.00023	<0.00023	**0.0013**	**0.00140**	**0.0023**	**0.0087**		**438.00**
# DATA	56	61	61	45	48	49	59	46	44	62	62	62	62	43	62
# > MDL	24	8	9	8	15	24	36	28	32	52	57	7	10	26	34
# > PCL	14	2	4	0	4	1	1	0	1	13	22	0	0	22	10

<5.00	**Less Than Method Detction Limit**
5.00	**Greater than Method Detection Limit but Less Than PCL**
5.00	**Greater than the PCL**
BLANK	**No Analysis for this event identified**
	LNAPL Present at time of Sampling

SUPPLEMENTAL TABLE XI.B.[c]

BICA HISTORICAL RESULTS - BENZENE

Well >	MW-153	MW-153A	MW-154	MW-154A	MW-155	MW-155A	MW-163	MW-163A	MW-165R	MW-165AR	MW-166	MW-166A	RW-173	RW-174
Constituent >	Benzene	Benzene	Benzene	Benzene	Benzene	Benzene	Benzene	Benzene	Benzene	Benzene	Benzene	Benzene	Benzene	Benzene
$^{GW}GW_{Class3}$ >	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l
Sat. Zone >	U. Sand	L. Gravel	U. Sand	L. Gravel	U. Sand	L. Gravel	U. Sand	L. Gravel	U. Sand	L. Gravel	U. Sand	L. Gravel	U. Sand	U. Sand
Jul-09	0.038	0.043	<0.001	0.0075	<0.001	0.30	<0.001	0.0061	<0.001	<0.001	<0.001	<0.001		
Jan-10	0.036	0.040	<0.001	0.015	<0.001	0.120	<0.001	0.008	<0.001	<0.001	<0.001	<0.001	21.000	
Jul-10	0.029	0.030	<0.001	0.006	<0.001	0.140	<0.001	0.005	<0.001	<0.001	<0.001	<0.001		
Jan-11	0.024	0.023	<0.001	0.004	<0.001	0.440	<0.001	0.004	<0.001	<0.001	<0.001	<0.001		
Jul-11	0.0076	<0.00025	<0.00025	0.0059	<0.00025	0.571	<0.00025	0.0042	<0.00025	<0.00025	<0.00025	<0.00025		
Jan-12	0.0244	0.086	<0.00025	0.0056	<0.00025	0.580	<0.001	0.0039	<0.00025	<0.00025	0.0011	<0.00025		
Jul-12	0.0182	0.0186	<0.00025	0.0048	<0.00025	0.40	0.0005	0.0033	<0.00025	<0.00025	<0.00025	<0.00025		
Jan-13	0.0162	0.0145	<0.00034	0.0053	<0.0020	0.3700	<0.00035	0.0032	<0.00034	<0.00034	0.0006	0.0009		
Jul-13	0.0175	0.0147	<0.00034	0.0100	0.0066	0.556	<0.00034	0.0044	0.0023	0.0024	<0.00034	<0.00034		
Jan-14	0.0185	0.0192	<0.00034	0.0089	<0.00034	0.3880	<0.00034	0.0035	<0.00034	0.0008	<0.00034	<0.00034		
Jul-14	0.0803	0.0191	<0.00034	0.0255	0.0023	0.1860	0.0004	0.0088	<0.00034	<0.00034	<0.00034	<0.00034		
Mar-15	0.0186	0.0179	<0.00034	0.0255	<0.00034	0.4660	<0.00034	1.060	<0.00034	0.0013	<0.00034	<0.00034		
Jul-15	0.0177	0.0152	<0.00034	0.0056	<0.00034	0.612	<0.00034	0.0023	<0.00034	<0.00034	<0.00034	<0.00034		
Jan-16	0.0173	0.0162	<0.00047	0.0239	<0.00047	0.4190	<0.00047	0.0142	<0.00047	<0.00047	<0.00047	<0.00047		
Jul-16	0.0136	0.0135	<0.00047	0.0204	<0.00047	0.4390	<0.00047	<0.00047	<0.00047	<0.00047	<0.00047	<0.00047		
Jan-17	0.0112	0.0108	<0.00047	0.0169	<0.00047	0.4090	<0.00047	<0.00047	<0.00047	<0.00047	<0.00047	<0.00047		
Jul-17	0.0120	0.0122	<0.0003	0.0404	<0.0003	0.3580	0.0004	0.0005	<0.0003	<0.0003	<0.0003	<0.0003		
Jan-18	0.0100	0.0095	<0.0003	0.0109	<0.0003	0.2790	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003		
Jul-18	0.0113	0.0121	<0.0004	0.0129	<0.0004	0.3210	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004		
Jan-19	0.0098	0.0108	<0.0004	0.0030	<0.0004	0.3690	<0.0004	<0.0004			<0.0004	<0.0004		
Jul-19	0.0077	0.0113	<0.0004	0.0037	<0.0004	0.4320	<0.0004	<0.0004			<0.0004	<0.0004		
Jan-20	0.0081	0.0102	<0.0003	0.0010	<0.0003	0.3430	<0.0003	<0.0003			<0.0003	<0.0003		
Jul-20	0.0099	0.0122	0.0004	0.0017	0.0005	0.3860	<0.0003	<0.0003			<0.0003	<0.0003		
Jan-21	0.0134	0.0060	<0.0003	0.0008	<0.0003	0.3500	<0.0003	<0.0003			<0.0003	<0.0003		
Jul-21	0.0158	0.0142	<0.0003	0.0011	<0.0003	0.3740	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003		
Jan-22	0.0156	0.0149	<0.0003	0.0009	<0.0003	0.3990	0.0007	0.0003	<0.0003	<0.0003	<0.0003	0.0004		
Jul-22	0.0003	0.0082	<0.00023	0.0006	<0.00023	0.2950	0.0006	<0.00023	<0.00023	<0.00023	<0.00023	<0.00023		
Jan-23	0.01070	0.0109	<0.00023	0.00078	<0.00023	0.1830	<0.00023	<0.00023	<0.00023	<0.00023	<0.00023	<0.00023		
Jul-23	0.00160	0.0102	<0.00023	0.00050	<0.00023	0.3310	0.00023	0.00700	<0.00023	<0.00023	<0.00023	<0.00023		
Jan-24	0.02830	0.0109	0.00170	0.00220	0.00073	0.4360	0.00088	2.06000	<0.00023	<0.00023	<0.00023	0.00770		
# DATA	62	62	48	63	64	65	62	62	64	64	69	69	3	1
# > MDL	52	53	2	55	5	58	11	41	3	4	2	3	3	1
# > PCL	0	1	0	0	0	8	0	2	0	0	0	0	3	1

<5.00	Less Than Method Detction Limit
5.00	Greater than Method Detection Limit but Less Than PCL
5.00	Greater than the PCL
BLANK	No Analysis for this event identified
	LNAPL Present at time of Sampling

SUPPLEMENTAL TABLE XI.B.[c]

BICA HISTORICAL RESULTS - BENZENE

Well >	RW-175	RW-177	RW-178	RW-179	RW-185	RW-192	RW-194	RW-195	MW-214	MW-214A	MW-215	MW-215A	MW-218	MW-218A	MW-220
Constituent >	Benzene	Benzene	Benzene	Benzene	Benzene	Benzene	Benzene	Benzene	Benzene	Benzene	Benzene	Benzene	Benzene	Benzene	Benzene
$^{GW}GW_{Class3}$ >	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l
Sat. Zone >	U. Sand	U. Sand	U. Sand	U. Sand	U. Sand	U. Sand	Sand & Gravel	Sand & Gravel	U. Sand	L. Gravel	U. Sand	L. Gravel	U. Sand	L. Gravel	U. Sand
Jul-09							0.14	<0.001	0.0031	0.0020	<0.001	<0.001	0.0010	0.038	0.0015
Jan-10								<0.001	<0.001	0.001	<0.001	0.001	<0.001	0.067	<0.001
Jul-10							0.002	0.011	0.005	<0.001	<0.001	0.004	<0.001	0.013	<0.001
Jan-11							0.002	<0.001	0.002	0.003	0.002	0.002	<0.001	0.048	<0.001
Jul-11							0.0025	<0.00025	0.00046	0.0011	<0.00025	0.0014	0.00063	0.0285	
Jan-12							<0.001	<0.00025	0.00051	0.0011	<0.00025	0.002	<0.001	0.0308	
Jul-12								0.0015	0.0012	0.0014	<0.00025	0.0013	0.0008	0.0558	
Jan-13							0.0010	0.0012	0.0009	0.0019	<0.00034	0.0011	0.0004	0.0483	
Jul-13							<0.00034	0.0036	0.0010	0.0061	0.0045	0.0012	0.0042	0.0819	<0.00034
Jan-14						0.0227		<0.00034	0.0004	0.0016	<0.00034	0.0031	0.0008		
Jul-14								0.0015	0.0004	0.0106	<0.00034	0.00094	0.0010	0.0528	<0.00034
Mar-15							<0.00034	<0.00034	0.0013	0.0049	0.0012	<0.00034	0.0036	0.0556	0.0028
Jul-15							<0.00034	<0.00034	<0.00034	0.0019	<0.00034	<0.00034	0.00068	0.0024	<0.00034
Jan-16							0.0007	<0.00047	0.0021	0.0025	<0.00047	<0.00047	0.00370	0.0095	<0.00047
Jul-16							<0.00047	<0.00047	<0.00047	0.0021	<0.00047	<0.00047	0.00071	0.0098	<0.00047
Jan-17							0.0007	<0.00047	<0.00047	0.0031	0.00066	<0.00047	0.00140	0.0185	<0.00047
Jul-17							0.0006	<0.0003	0.0027	0.0024	<0.0003		0.00120	0.0908	<0.0003
Jan-18							0.0005	<0.0003	<0.0003	0.0010	<0.0003		0.00067	0.0073	<0.0003
Jul-18							0.0156	<0.0004	0.0016	0.0014	<0.0004		0.00082	0.0949	<0.0004
Jan-19							0.0007	0.0030	<0.0004	<0.0004	0.00071	<0.0004	0.00041	0.0908	<0.0004
Jul-19							0.0005	0.0007	<0.0004	0.0005	0.00064	<0.0004	<0.0004	0.1080	<0.0004
Jan-20							0.0005	0.0005	<0.0003	0.0004	0.00070	<0.0003	<0.0003	0.1230	<0.0003
Jul-20							<0.00030	0.0019	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	0.1710	<0.0003
Jan-21							0.0007	0.0010	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	0.2520	<0.0003
Jul-21							0.0004	0.0010	<0.0003	0.0005	<0.0003	<0.0003	<0.0003	0.2390	<0.0003
Jan-22							<0.00030	<0.00030	0.0004	<0.0003	<0.015	<0.015	<0.015	0.0444	<0.0003
Jul-22							<0.0023	<0.00023	0.0003	<0.00023	<0.00023	<0.00023	<0.00023	0.0443	<0.00023
Jan-23							<0.00023	<0.00023	<0.00023	<0.00023	<0.00023	<0.00023	<0.00023	0.0045	<0.00023
Jul-23							<0.00023	<0.00023	0.00053	<0.00023	<0.00023	<0.00023	<0.00023	0.0005	<0.00023
Jan-24							<0.00023	0.00043	0.00087	<0.00023	0.00027	<0.00023	0.00035	0.0008	<0.00023
# DATA	2	0	0	0	0	25	51	57	57	62	62	37	63	62	50
# > MDL	2	0	0	0	0	24	38	15	33	42	20	12	18	56	6
# > PCL	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0

<5.00	Less Than Method Detction Limit
5.00	Greater than Method Detection Limit but Less Than PCL
5.00	Greater than the PCL
BLANK	No Analysis for this event identified
	LNAPL Present at time of Sampling

SUPPLEMENTAL TABLE XI.B.[c]

BICA HISTORICAL RESULTS - BENZENE

Well >	MW-220A	MW-221	MW-221A	MW-223	MW-223A	MW-224	MW-224A	MW-225	MW-225A	MW-227	MW-227A	RW-228
Constituent >	Benzene	Benzene	Benzene	Benzene	Benzene	Benzene	Benzene	Benzene	Benzene	Benzene	Benzene	Benzene
$^{GW}GW_{Class3}$ >	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l	0.5 mg/l
Sat. Zone >	L. Gravel	U. Sand	L. Gravel	U. Sand	L. Gravel	U. Sand	L. Gravel	U. Sand	L. Gravel	U. Sand	L. Gravel	U. Sand
Jul-09	**0.0016**		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**0.013**	**0.067**	
Jan-10	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**0.018**	**0.063**	
Jul-10	<0.001	**0.0046**	<0.001	**0.0011**	<0.001	<0.001	<0.001	<0.001	**0.001**	**0.018**	**0.047**	
Jan-11	<0.001	**0.0015**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**0.017**	**0.036**	
Jul-11	<0.00025	**0.0015**	**0.00049**	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	**0.00068**	<0.00025	**0.0179**	
Jan-12	<0.00025		**0.00045**	<0.00025	<0.00025	**0.00028**	<0.00025	**0.022**	<0.00025	**0.0231**	**0.0109**	
Jul-12	**0.0020**	**0.00068**	**0.00026**	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	**0.018**	**0.0108**	
Jan-13	<0.00034		**0.0005**	<0.00034	<0.00034	**0.0004**	**0.0006**	<0.00034	<0.0018	**0.0199**	**0.0084**	
Jul-13	<0.00034		<0.00034	<0.00034	<0.00034	<0.00034	<0.00034	<0.00034	<0.00034	**0.0173**	**0.0047**	
Jan-14	<0.00034		**0.0003**	<0.00034	<0.00034	<0.00034	<0.00034	<0.00034	<0.00034	**0.0196**	**0.0054**	
Jul-14	<0.00034		<0.00034	<0.00034	<0.00034	<0.00034	<0.00034	**0.0009**	**0.0005**	**0.0213**	**0.0038**	
Mar-15			**0.0024**	**0.00096**	**0.00065**	**0.00055**	**0.00059**	**0.00050**	<0.00034	<0.00034	**0.0027**	
Jul-15	<0.00034		<0.00034	<0.00034	<0.00034	<0.00034	<0.00034	<0.00034	<0.00034	**0.0166**	**0.0011**	
Jan-16	<0.00047		**0.00068**	<0.00047	<0.00047	<0.00047	<0.00047	<0.00047	<0.00047	**0.0243**	**0.00096**	
Jul-16	<0.00047		<0.00047	<0.00047	<0.00047	<0.00047	<0.00047	<0.00047	<0.00047	**0.0196**	**0.00086**	
Jan-17	<0.00047		**0.00074**	<0.00047	<0.00047	<0.00047	<0.00047	<0.00047	<0.00047	**0.0189**	**0.00160**	
Jul-17	0.0004		**0.00076**	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	**0.0155**	**0.00070**	
Jan-18	<0.0003		**0.00059**	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	**0.0066**	**0.00037**	
Jul-18	<0.0004		**0.00067**	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	**0.0066**	**0.00690**	
Jan-19	<0.0004		**0.00052**	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	**0.0013**	<0.0004	
Jul-19	<0.0004		<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	**0.0010**	<0.0004	
Jan-20	**0.0007**		**0.00035**	<0.0003	**0.0003**	<0.0003	<0.0003	<0.0003	<0.0003	**0.0006**	**0.00067**	
Jul-20	<0.0003		<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	
Jan-21	<0.0003		**0.00058**	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	
Jul-21	<0.0003		<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	**0.0003**	**0.0004**	
Jan-22	<0.0003		<0.0003	<0.0003	**0.0003**	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	**0.00440**	
Jul-22	<0.00023		<0.00023	<0.00023	<0.00023	<0.00023	<0.00023	<0.00023	<0.00023	**0.0039**	**0.0003**	
Jan-23	<0.00023		**0.00036**	<0.00023	<0.00023	<0.00023	<0.00023	<0.00023	<0.00023	**0.00068**	<0.00023	
Jul-23	<0.00023		**0.00056**	<0.00023	<0.00023	<0.00023	<0.00023	<0.00023	<0.00023	**0.01040**	<0.00023	
Jan-24	<0.00023		**0.00055**	<0.00023	<0.00023	<0.00023	<0.00023	<0.00023	<0.00023	**0.00077**	<0.00023	
# DATA	54	22	54	55	55	55	55	55	55	55	55	0
# > MDL	9	6	18	2	3	4	3	5	26	38	47	0
# > PCL	0	0	0	0	0	0	0	0	0	0	0	0

<5.00	**Less Than Method Detction Limit**
5.00	**Greater than Method Detection Limit but Less Than PCL**
5.00	**Greater than the PCL**
BLANK	**No Analysis for this event identified**
	LNAPL Present at time of Sampling

SUPPLEMENTAL TABLE XI.B.[d]

BICA HISTORICAL RESULTS - CHROMIUM

Well >	IW-45	IW-46	IW-57	IW-59	IW-60	IW-61	IW-81	W-102	W-104	W-105	DW-113
Constituent >	Chromium, total	Chromium, total	Chromium, total	Chromium, total	Chromium, total	Chromium, total	Chromium, total	Chromium, total	Chromium, total	Chromium, total	Chromium, total
$^{GW}GW_{Class3}$ >	10 mg/l	10 mg/l	10 mg/l	10 mg/l	10 mg/l	10 mg/l	10 mg/l	10 mg/l	10 mg/l	10 mg/l	10 mg/l
Sat. Zone >	U. SAND	U. SAND	U. SAND	U. SAND	U. SAND	U. SAND	U. SAND	U. SAND	SHALLOW	U. SAND	U. SAND
NOV-93	<0.01		<0.01	<0.010	<0.010	<0.010	<0.010				
JAN-94	<0.010	<0.010									
FEB-94											
MAR-94								<0.010		<0.010	<0.010
JUL-94											
MAR-99									<0.010		

Well >	DW-115	DW-116	DW-120	DW-121	DW-123	IW-127	IW-128	DW-130	DW-131	DW-132	DW-133
Constituent >	Chromium, total	Chromium, total	Chromium, total	Chromium, total	Chromium, total	Chromium, total	Chromium, total	Chromium, total	Chromium, total	Chromium, total	Chromium, total
$^{GW}GW_{Class3}$ >	10 mg/l	10 mg/l	10 mg/l	10 mg/l	10 mg/l	10 mg/l	10 mg/l	10 mg/l	10 mg/l	10 mg/l	10 mg/l
Sat. Zone >	U. SAND	U. SAND	U. SAND	U. SAND	U. SAND	U. SAND	U. SAND	U. SAND	U. SAND	U. SAND	U. SAND
NOV-93											
JAN-94											
FEB-94			<0.010	<0.010	<0.010	<0.010	<0.010	<0.010			
MAR-94	<0.010	<0.010							<0.01	<0.010	<0.010
JUL-94											
MAR-99											

Well >	IW-134	IW-135	IW-136	IW-137	IW-138	IW-139	DW-118	DW-118A	MW-125	MW-125A	MW-126
Constituent >	Chromium, total	Chromium, total	Chromium, total	Chromium, total	Chromium, total	Chromium, total	Chromium, total	Chromium, total	Chromium, total	Chromium, total	Chromium, total
$^{GW}GW_{Class3}$ >	10 mg/l	10 mg/l	10 mg/l	10 mg/l	10 mg/l	10 mg/l	10 mg/l	10 mg/l	10 mg/l	10 mg/l	10 mg/l
Sat. Zone >	U. SAND	U. SAND	U. SAND	U. SAND	U. SAND	U. SAND	U. SAND	L. GRAVEL	U. SAND	L. GRAVEL	U. SAND
NOV-93											
JAN-94											
FEB-94	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
MAR-94											
JUL-94											
MAR-99											

Well >	MW-126A	MW-152	MW-152A	MW-153	MW-153A	MW-154	MW-154A	MW-42A	MW-43A	MW-78A	MW-79A
Constituent >	Chromium, total	Chromium, total	Chromium, total	Chromium, total	Chromium, total	Chromium, total	Chromium, total	Chromium, total	Chromium, total	Chromium, total	Chromium, total
$^{GW}GW_{Class3}$ >	10 mg/l	10 mg/l	10 mg/l	10 mg/l	10 mg/l	10 mg/l	10 mg/l	10 mg/l	10 mg/l	10 mg/l	10 mg/l
Sat. Zone >	L. GRAVEL	U. SAND	L. GRAVEL	U. SAND	L. GRAVEL	U. SAND	L. GRAVEL	L. GRAVEL	L. GRAVEL	L. GRAVEL	L. GRAVEL
NOV-93								<0.010	<0.01	<0.010	<0.010
JAN-94											
FEB-94	<0.010										
MAR-94											
JUL-94		<0.002	<0.002	**0.002**	<0.002	<0.002	<0.002				
MAR-99											

LNAPL Present at time of Sampling
<5.00
Less Than Method Detction Limit
5.00
Greater than Method Detection Limit but Less Than PCL
5.00
Greater than the PCL
BLANK
No Analysis for this event identified

# DATA	45
# > MDL	1
# > PCL	0

SUPPLEMENTAL TABLE XI.B.[e]

BICA HISTORICAL RESULTS - CHROMIUM

Well >	IW-45	IW-46	IW-57	IW-59	IW-60	IW-61	IW-81	W-102	W-104	W-105	DW-113
Constituent >	Lead	Lead	Lead	Lead	Lead	Lead	Lead	Lead	Lead	Lead	Lead
$^{GW}GW_{Class3}$ >	1.5 mg/l	1.5 mg/l	1.5 mg/l	1.5 mg/l	1.5 mg/l	1.5 mg/l	1.5 mg/l	1.5 mg/l	1.5 mg/l	1.5 mg/l	1.5 mg/l
Sat. Zone >	U. SAND	U. SAND	U. SAND	U. SAND	U. SAND	U. SAND	U. SAND	U. SAND	SHALLOW	U. SAND	U. SAND
NOV-93	<0.05		<0.05	<0.05	<0.050	<0.050	<0.005				
JAN-94	<0.030	<0.030									
FEB-94											
MAR-94								<0.030		<0.030	<0.030
JUL-94											
MAR-99									<0.005		

Well >	DW-115	DW-116	DW-120	DW-121	DW-123	IW-127	IW-128	DW-130	DW-131	DW-133	IW-134
Constituent >	Lead	Lead	Lead	Lead	Lead	Lead	Lead	Lead	Lead	Lead	Lead
$^{GW}GW_{Class3}$ >	1.5 mg/l	1.5 mg/l	1.5 mg/l	1.5 mg/l	1.5 mg/l	1.5 mg/l	1.5 mg/l	1.5 mg/l	1.5 mg/l	1.5 mg/l	1.5 mg/l
Sat. Zone >	U. SAND	U. SAND	U. SAND	U. SAND	U. SAND	U. SAND	U. SAND	U. SAND	U. SAND	U. SAND	U. SAND
NOV-93											
JAN-94											
FEB-94			<0.030	<0.030	<0.030	<0.030	<0.030	<0.030			<0.030
MAR-94	**0.060**	<0.030							<0.03	<0.030	
JUL-94											
MAR-99											

Well >	IW-135	IW-136	IW-137	IW-138	IW-139	DW-118	DW-118A	MW-125	MW-125A	MW-126	MW-126A
Constituent >	Lead	Lead	Lead	Lead	Lead	Lead	Lead	Lead	Lead	Lead	Lead
$^{GW}GW_{Class3}$ >	1.5 mg/l	1.5 mg/l	1.5 mg/l	1.5 mg/l	1.5 mg/l	1.5 mg/l	1.5 mg/l	1.5 mg/l	1.5 mg/l	1.5 mg/l	1.5 mg/l
Sat. Zone >	U. SAND	U. SAND	U. SAND	U. SAND	U. SAND	U. SAND	L. GRAVEL	U. SAND	L. GRAVEL	U. SAND	L. GRAVEL
NOV-93											
JAN-94											
FEB-94	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
MAR-94											
JUL-94											
MAR-99											

Well >	MW-152	MW-152A	MW-153	MW-153A	MW-154	MW-154A	MW-42A	MW-43A	MW-78A	MW-79A	
Constituent >	Lead	Lead	Lead	Lead	Lead	Lead	Lead	Lead	Lead	Lead	
$^{GW}GW_{Class3}$ >	1.5 mg/l	1.5 mg/l	1.5 mg/l	1.5 mg/l	1.5 mg/l	1.5 mg/l	1.5 mg/l	1.5 mg/l	1.5 mg/l	1.5 mg/l	
Sat. Zone >	U. SAND	L. GRAVEL	U. SAND	L. GRAVEL	U. SAND	L. GRAVEL	L. GRAVEL	L. GRAVEL	L. GRAVEL	L. GRAVEL	
NOV-93							<0.05	<0.05	**0.080**	<0.005	
JAN-94											
FEB-94											
MAR-94											
JUL-94	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005					
MAR-99											

LNAPL Present at time of Sampling
<5.00 Less Than Method Detction Limit
5.00 **Greater than Method Detection Limit but Less Than PCL**
5.00 **Greater than the PCL**
BLANK **No Analysis for this event identified**

# DATA	44
# > MDL	2
# > PCL	0

SUPPLEMENTAL TABLE XI.B.[f]

BICA HISTORICAL RESULTS - MAGNESIUM

Well >	IW-45	IW-46	IW-57	IW-59	IW-60	IW-61	IW-81	W-102	W-104	W-105	DW-113
Constituent >	Magnesium	Magnesium	Magnesium	Magnesium	Magnesium	Magnesium	Magnesium	Magnesium	Magnesium	Magnesium	Magnesium
$^{GW}GW_{Class3}$ >	na	na	na	na	na	na	na	na	na	na	na
Sat. Zone >	U. SAND	U. SAND	U. SAND	U. SAND	U. SAND	U. SAND	U. SAND	U. SAND	SHALLOW	U. SAND	U. SAND
NOV-93	490		520	750	420	19	3				
JAN-94	490	373									
FEB-94											
MAR-94								303		12	60
MAR-99									32		

Well >	DW-115	DW-116	DW-120	DW-121	DW-123	IW-127	IW-128	DW-130	DW-131	DW-132	DW-133
Constituent >	Magnesium	Magnesium	Magnesium	Magnesium	Magnesium	Magnesium	Magnesium	Magnesium	Magnesium	Magnesium	Magnesium
$^{GW}GW_{Class3}$ >	na	na	na	na	na	na	na	na	na	na	na
Sat. Zone >	U. SAND	U. SAND	U. SAND	U. SAND	U. SAND	U. SAND	U. SAND	U. SAND	U. SAND	U. SAND	U. SAND
NOV-93											
JAN-94											
FEB-94			14	36	28	174	36	27			
MAR-94	226	66							148	30	11
MAR-99											

Well >	IW-134	IW-135	IW-136	IW-137	IW-138	IW-139	DW-118	DW-118A	MW-125	MW-125A	MW-126
Constituent >	Magnesium	Magnesium	Magnesium	Magnesium	Magnesium	Magnesium	Magnesium	Magnesium	Magnesium	Magnesium	Magnesium
$^{GW}GW_{Class3}$ >	na	na	na	na	na	na	na	na	na	na	na
Sat. Zone >	U. SAND	U. SAND	U. SAND	U. SAND	U. SAND	U. SAND	U. SAND	L. GRAVEL	U. SAND	L. GRAVEL	U. SAND
NOV-93											
JAN-94											
FEB-94	36	54	42	384	518	51	99	84	239	266	484
MAR-94											
MAR-99											

Well >	MW-126A	MW-42A	MW-43A	MW-78A	MW-79A						
Constituent >	Magnesium	Magnesium	Magnesium	Magnesium	Magnesium						
$^{GW}GW_{Class3}$ >	na	na	na	na	na						
Sat. Zone >	L. GRAVEL	L. GRAVEL	L. GRAVEL	L. GRAVEL	L. GRAVEL						
NOV-93		360	300	740	29						
JAN-94											
FEB-94	478										
MAR-94											
MAR-99											

LNAPL Present at time of Sampling
<5.00
Less Than Method Detction Limit
5.00
Greater than Method Detection Limit but Less Than PCL
5.00
Greater than the PCL
BLANK
No Analysis for this event identified

# DATA	39
# > MDL	39
# > PCL	NA

SUPPLEMENTAL TABLE XI.B.[g]

BICA HISTORICAL RESULTS - PHENOL

Well >	IW-45	IW-46	IW-57	IW-59	IW-60	IW-61	IW-81	W-102	W-104	W-105	DW-113
Constituent >	Phenol	Phenol	Phenol	Phenol	Phenol	Phenol	Phenol	Phenol	Phenol	Phenol	Phenol
$^{GW}GW_{Class3}$ >	730 mg/l	730 mg/l	730 mg/l	730 mg/l	730 mg/l	730 mg/l	730 mg/l	730 mg/l	730 mg/l	730 mg/l	730 mg/l
Sat. Zone >	U. SAND	U. SAND	U. SAND	U. SAND	U. SAND	U. SAND	U. SAND	U. SAND	SHALLOW	U. SAND	U. SAND
NOV-93	<0.010		<0.010	<0.011	<0.010	<0.010	<0.010				
JAN-94	<0.010	<0.010									
FEB-94											
MAR-94								**0.034**		<0.011	<0.011
JUL-94											
MAR-99									<0.011		

Well >	DW-115	DW-116	DW-120	DW-121	DW-123	IW-127	IW-128	DW-130	DW-131	DW-132	DW-133
Constituent >	Phenol	Phenol	Phenol	Phenol	Phenol	Phenol	Phenol	Phenol	Phenol	Phenol	Phenol
$^{GW}GW_{Class3}$ >	730 mg/l	730 mg/l	730 mg/l	730 mg/l	730 mg/l	730 mg/l	730 mg/l	730 mg/l	730 mg/l	730 mg/l	730 mg/l
Sat. Zone >	U. SAND	U. SAND	U. SAND	U. SAND	U. SAND	U. SAND	U. SAND	U. SAND	U. SAND	U. SAND	U. SAND
NOV-93											
JAN-94											
FEB-94			<0.010	<0.010	<0.011	<0.010	<0.010	<0.011			
MAR-94	<0.010	<0.011							**0.130**	<0.010	<0.011
JUL-94											
MAR-99											

Well >	IW-134	IW-135	IW-136	IW-137	IW-138	IW-139	DW-118	DW-118A	MW-125	MW-125A	MW-126
Constituent >	Phenol	Phenol	Phenol	Phenol	Phenol	Phenol	Phenol	Phenol	Phenol	Phenol	Phenol
$^{GW}GW_{Class3}$ >	730 mg/l	730 mg/l	730 mg/l	730 mg/l	730 mg/l	730 mg/l	730 mg/l	730 mg/l	730 mg/l	730 mg/l	730 mg/l
Sat. Zone >	U. SAND	U. SAND	U. SAND	U. SAND	U. SAND	U. SAND	U. SAND	L. GRAVEL	U. SAND	L. GRAVEL	U. SAND
NOV-93											
JAN-94											
FEB-94	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.011	<0.010	<0.010	<0.011	<0.011
MAR-94											
JUL-94											
MAR-99											

Well >	MW-126A	MW-152	MW-152A	MW-153	MW-153A	MW-154	MW-154A	MW-42A	MW-43A	MW-78A	
Constituent >	Phenol	Phenol	Phenol	Phenol	Phenol	Phenol	Phenol	Phenol	Phenol	Phenol	
$^{GW}GW_{Class3}$ >	730 mg/l	730 mg/l	730 mg/l	730 mg/l	730 mg/l	730 mg/l	730 mg/l	730 mg/l	730 mg/l	730 mg/l	
Sat. Zone >	L. GRAVEL	U. SAND	L. GRAVEL	U. SAND	L. GRAVEL	U. SAND	L. GRAVEL	L. GRAVEL	L. GRAVEL	L. GRAVEL	
NOV-93								**0.081**	**0.068**	<0.010	
JAN-94											
FEB-94	<0.010										
MAR-94											
JUL-94		<0.010	<0.010	<0.010	<0.010	<0.010	<0.010				
MAR-99											

LNAPL Present at time of Sampling
<5.00
Less Than Method Detction Limit
5.00
Greater than Method Detection Limit but Less Than PCL
5.00
Greater than the PCL
BLANK
No Analysis for this event identified

# DATA	44
# > MDL	4
# > PCL	0

SUPPLEMENTAL TABLE XI.B.[h]

BICA HISTORICAL RESULTS - TOLUENE

Well >	IW-45	IW-46	IW-57	IW-59	IW-60	IW-61	IW-81	W-102	W-104	W-105	DW-113
Constituent >	Toluene	Toluene	Toluene	Toluene	Toluene	Toluene	Toluene	Toluene	Toluene	Toluene	Toluene
$^{GW}GW_{Class3}$ >	100 mg/l	100 mg/l	100 mg/l	100 mg/l	100 mg/l	100 mg/l	100 mg/l	100 mg/l	100 mg/l	100 mg/l	100 mg/l
Sat. Zone >	U. SAND	U. SAND	U. SAND	U. SAND	U. SAND	U. SAND	U. SAND	U. SAND	SHALLOW	U. SAND	U. SAND
NOV-93	**0.26**		<0.100	<0.100	<0.002	**0.0028**	<0.001				
JAN-94	<0.100	<0.001									
FEB-94											
MAR-94								<0.100		<0.001	<0.010
JUL-94											
MAR-99									**0.015**		

Well >	DW-115	DW-116	DW-120	DW-121	DW-123	IW-127	IW-128	DW-130	DW-131	DW-132	DW-133
Constituent >	Toluene	Toluene	Toluene	Toluene	Toluene	Toluene	Toluene	Toluene	Toluene	Toluene	Toluene
$^{GW}GW_{Class3}$ >	100 mg/l	100 mg/l	100 mg/l	100 mg/l	100 mg/l	100 mg/l	100 mg/l	100 mg/l	100 mg/l	100 mg/l	100 mg/l
Sat. Zone >	U. SAND	U. SAND	U. SAND	U. SAND	U. SAND	U. SAND	U. SAND	U. SAND	U. SAND	U. SAND	U. SAND
NOV-93											
JAN-94											
FEB-94			**5.800**	**0.0012**	<0.001	<0.010	<0.100	**0.370**			
MAR-94	**0.0028**	<0.001							<1	**0.430**	<0.001
JUL-94											
MAR-99											

Well >	IW-134	IW-135	IW-136	IW-137	IW-138	IW-139	DW-118	DW-118A	MW-125	MW-125A	MW-126
Constituent >	Toluene	Toluene	Toluene	Toluene	Toluene	Toluene	Toluene	Toluene	Toluene	Toluene	Toluene
$^{GW}GW_{Class3}$ >	100 mg/l	100 mg/l	100 mg/l	100 mg/l	100 mg/l	100 mg/l	100 mg/l	100 mg/l	100 mg/l	100 mg/l	100 mg/l
Sat. Zone >	U. SAND	U. SAND	U. SAND	U. SAND	U. SAND	U. SAND	U. SAND	L. GRAVEL	U. SAND	L. GRAVEL	U. SAND
NOV-93											
JAN-94											
FEB-94	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.010	<0.001	<0.010	<0.010	<0.001
MAR-94											
JUL-94											
MAR-99											

Well >	MW-126A	MW-152	MW-152A	MW-153	MW-153A	MW-154	MW-154A	MW-42A	MW-43A	MW-78A	MW-79A
Constituent >	Toluene	Toluene	Toluene	Toluene	Toluene	Toluene	Toluene	Toluene	Toluene	Toluene	Toluene
$^{GW}GW_{Class3}$ >	100 mg/l	100 mg/l	100 mg/l	100 mg/l	100 mg/l	100 mg/l	100 mg/l	100 mg/l	100 mg/l	100 mg/l	100 mg/l
Sat. Zone >	L. GRAVEL	U. SAND	L. GRAVEL	U. SAND	L. GRAVEL	U. SAND	L. GRAVEL	L. GRAVEL	L. GRAVEL	L. GRAVEL	L. GRAVEL
NOV-93								**2.2**	**0.23**	<0.100	<0.010
JAN-94											
FEB-94	<0.001										
MAR-94											
JUL-94		<0.001	**0.002**	<0.001	<0.001	<0.001	<0.001				
MAR-99											

LNAPL Present at time of Sampling
<5.00
Less Than Method Detction Limit
5.00
Greater than Method Detection Limit but Less Than PCL
5.00
Greater than the PCL
BLANK
No Analysis for this event identified

# DATA	45
# > MDL	11
# > PCL	0

SUPPLEMENTAL TABLE XI.B.[i]

BICA HISTORICAL RESULTS - XYLENES, total

Well >	IW-45	IW-46	IW-57	IW-59	IW-60	IW-61	IW-81	W-102	W-104	W-105	DW-113
Constituent >	Xylene (total)	Xylene (total)	Xylene (total)	Xylene (total)	Xylene (total)	Xylene (total)	Xylene (total)	Xylene (total)	Xylene (total)	Xylene (total)	Xylene (total)
$^{GW}GW_{Class3}$ >	1000 mg/l	1000 mg/l	1000 mg/l	1000 mg/l	1000 mg/l	1000 mg/l	1000 mg/l	1000 mg/l	1000 mg/l	1000 mg/l	1000 mg/l
Sat. Zone >	U. SAND	U. SAND	U. SAND	U. SAND	U. SAND	U. SAND	U. SAND	U. SAND	SHALLOW	U. SAND	U. SAND
NOV-93	**0.89**		<0.500	<0.500	<0.010	<0.050	<0.050				
JAN-94	<0.500	<0.005									
FEB-94											
MAR-94								<0.500		<0.005	<0.050
JUL-94											
MAR-99									**0.028**		

Well >	DW-115	DW-116	DW-120	DW-121	DW-123	IW-127	IW-128	DW-130	DW-131	DW-132	DW-133
Constituent >	Xylene (total)	Xylene (total)	Xylene (total)	Xylene (total)	Xylene (total)	Xylene (total)	Xylene (total)	Xylene (total)	Xylene (total)	Xylene (total)	Xylene (total)
$^{GW}GW_{Class3}$ >	1000 mg/l	1000 mg/l	1000 mg/l	1000 mg/l	1000 mg/l	1000 mg/l	1000 mg/l	1000 mg/l	1000 mg/l	1000 mg/l	1000 mg/l
Sat. Zone >	U. SAND	U. SAND	U. SAND	U. SAND	U. SAND	U. SAND	U. SAND	U. SAND	U. SAND	U. SAND	U. SAND
NOV-93											
JAN-94											
FEB-94			**4.500**	**0.0076**	<0.005	<0.050	<0.500	**84.000**			
MAR-94	<0.005	<0.005							<5	**1.400**	<0.005
JUL-94											
MAR-99											

Well >	IW-134	IW-135	IW-136	IW-137	IW-138	IW-139	DW-118	DW-118A	MW-125	MW-125A	MW-126
Constituent >	Xylene (total)	Xylene (total)	Xylene (total)	Xylene (total)	Xylene (total)	Xylene (total)	Xylene (total)	Xylene (total)	Xylene (total)	Xylene (total)	Xylene (total)
$^{GW}GW_{Class3}$ >	1000 mg/l	1000 mg/l	1000 mg/l	1000 mg/l	1000 mg/l	1000 mg/l	1000 mg/l	1000 mg/l	1000 mg/l	1000 mg/l	1000 mg/l
Sat. Zone >	U. SAND	U. SAND	U. SAND	U. SAND	U. SAND	U. SAND	U. SAND	L. GRAVEL	U. SAND	L. GRAVEL	U. SAND
NOV-93											
JAN-94											
FEB-94	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.050	<0.005	<0.050	<0.050	<0.005
MAR-94											
JUL-94											
MAR-99											

Well >	MW-126A	MW-152	MW-152A	MW-153	MW-153A	MW-154	MW-154A	MW-42A	MW-43A	MW-78A	MW-79A
Constituent >	Xylene (total)	Xylene (total)	Xylene (total)	Xylene (total)	Xylene (total)	Xylene (total)	Xylene (total)	Xylene (total)	Xylene (total)	Xylene (total)	Xylene (total)
$^{GW}GW_{Class3}$ >	1000 mg/l	1000 mg/l	1000 mg/l	1000 mg/l	1000 mg/l	1000 mg/l	1000 mg/l	1000 mg/l	1000 mg/l	1000 mg/l	1000 mg/l
Sat. Zone >	L. GRAVEL	U. SAND	L. GRAVEL	U. SAND	L. GRAVEL	U. SAND	L. GRAVEL	L. GRAVEL	L. GRAVEL	L. GRAVEL	L. GRAVEL
NOV-93								**1.2**	**0.72**	<0.500	<0.050
JAN-94											
FEB-94	<0.005										
MAR-94											
JUL-94		<0.005	<0.005	<0.005	<0.005	<0.005	<0.005				
MAR-99											

LNAPL Present at time of Sampling
<5.00 Less Than Method Detction Limit
5.00 Greater than Method Detection Limit but Less Than PCL
5.00 Greater than the PCL
BLANK No Analysis for this event identified

# DATA	45
# > MDL	8
# > PCL	1

SUPPLEMENTAL TABLE XI.B.[j]

SITE E HISTORICAL RESULTS

Well >	MW-38	MW-39	MW-40	MW-41	MW-38A	MW-39A	MW-40A	MW-41A
Sat. Zone >	U Sand	U Sand	U Sand	U Sand	L Gravel	L Gravel	L Gravel	L Gravel
BENZENE: $^{GW}GW_{CLASS\ 3}$ = 0.50 mg/L								
OCT-87	0.110	0.270	0.430	0.440	0.260	0.004	0.460	0.380
FEB-88	0.580	0.280	0.310	0.340	0.037	<0.005	<0.005	0.012
JUN-88	0.480	0.320	0.420	0.480	0.036	0.005	0.150	0.010
SEP-88	0.400	0.250	0.250	0.380	0.007	0.008	0.180	<0.005
JAN-89	0.597	0.226	0.545	0.887	0.051	0.012	0.146	0.017
APR-89	0.388	0.415	0.327	0.693	0.070	0.018	0.270	0.017
JUL-89	0.883	0.789	0.794	1.400	0.126	<0.1	0.502	<0.1
OCT-89	0.418	0.463	0.452	0.639	0.214	0.011	0.299	0.020
JAN-90	0.402	0.318	0.504	0.852	0.275	0.014	0.456	0.027
APR-90	0.559	0.772	0.587	1.140	0.249	0.012	0.451	0.030
JUL-90	0.483	0.812	0.155	1.020	0.299	0.025	0.707	0.041
OCT-90	0.469	0.292	0.476	0.815	0.389	0.094	0.750	0.162
JAN-91	0.140	0.520	0.340	0.660	0.360	0.59	0.360	0.160
APR-91	0.317	0.595	0.410	0.608	0.324	0.480	0.366	0.220
JUL-91	0.314	0.478	0.400	0.900	0.215	0.456	0.289	0.344
OCT-91	0.190	0.860	0.430	0.890	0.410	0.580	0.420	0.150
JAN-92	0.227	0.197	0.478	0.384	0.386	0.758	0.357	0.046
APR-92		0.140	3.800	0.950		0.650	0.940	0.100
JUL-92		0.680	0.510	0.870		0.660	0.880	0.120
OCT-92		0.670	0.440	0.960		0.820	0.930	0.100
JAN-93		0.850	0.420	1.100		0.730	0.890	0.110
MAR-93		0.690	0.420	1.000		0.700	0.410	0.120
JUL-93		0.650	0.380	0.970		0.760	0.760	0.130
OCT-93		0.730	0.340	1.000		0.7700	0.890	0.1200
FEB-94		0.450	0.360	0.980		0.650	0.800	0.120
APR-94		0.580	0.380	0.820		0.510	0.320	0.160
JUL-94		0.770	0.380	1.000		0.730	0.640	0.180
OCT-94		0.610	0.390	0.880		0.620	0.300	0.250
JAN-95		0.532	0.382	9.500		0.413	0.385	0.190
APR-95		0.540	0.330	0.680		0.320	0.330	0.300
JUL-95		0.400	0.400	0.400		0.620	0.400	0.310
OCT-95		0.051	0.300	0.480		0.200	2.300	2.600
JAN-96		0.350	0.210	0.410		0.290	0.170	0.193
JUL-96		0.521	0.447	0.806		0.195	0.322	0.233
JAN-97		0.410	0.390	0.730		0.180	0.240	0.210
JUL-97		0.410	0.430	0.520		0.220	0.280	0.230
JAN-98		0.550	0.530	0.550		0.270	0.280	0.550
JUL-98		0.360	0.490	0.460		0.250	0.240	0.210
Jan-00		0.180	0.510	0.240		0.210	0.360	0.170
Jul-00		0.190	0.520	0.160		0.220	0.600	0.081
Jan-01		0.170	0.440	0.150		0.280	0.480	0.084
Jul-01		0.190	0.490	0.140	0.140	0.270	0.280	<0.005
Jan-02	0.140	0.270	0.550	0.190	0.200	0.370	0.500	0.056
Jul-02	0.110	0.290	0.560	0.280	0.170	0.340	0.470	0.094
Jan-03		0.290	0.650	0.260	0.190	0.340	0.400	0.110
Jul-03		0.170	0.450	0.180	0.140	0.240	0.360	0.079
Jan-04		0.280	0.560	0.170	0.140	0.340	0.350	0.080
Jul-04	0.100	0.240	0.500	0.160	0.130	0.310	0.370	0.080
Jan-05	0.120	0.310	0.430	0.140	0.150	0.270	0.290	0.081
Jul-05	0.120	0.350	0.570	0.150	0.230	0.290	0.320	0.160
Jan-06	0.100	0.370	0.580	0.270	0.210	0.290	0.270	0.270
Jul-06	0.120	0.350	0.390	0.220	0.210	0.320	0.280	0.300
Jan-07	0.120	0.260	0.410	0.200	0.190	0.250	0.230	0.230
Jul-07	0.13	0.38	0.50	0.24	0.20	0.31	0.24	0.24
Jan-08	0.120	0.240	0.400	0.180	0.150	0.170	0.210	0.150
Jul-08	0.160	0.380	0.550	0.230	0.180	0.310	0.270	0.170
Jan-09	0.170	0.390	0.540	0.220	0.160	0.310	0.260	0.200
Jul-09	0.040	0.380	0.420	0.250	0.150	0.250	0.280	0.200
Jan-10	0.060	0.340	0.260	0.210	0.130	0.220	0.280	0.180
Jul-10	0.077	0.370	0.380	0.220	0.160	0.270	0.370	0.230
Jan-11	0.059	0.280	0.240	0.160	0.110	0.290	0.270	0.190

SUPPLEMENTAL TABLE XI.B.[j]

SITE E HISTORICAL RESULTS

Well >	MW-38	MW-39	MW-40	MW-41	MW-38A	MW-39A	MW-40A	MW-41A
Sat. Zone >	U Sand	U Sand	U Sand	U Sand	L Gravel	L Gravel	L Gravel	L Gravel
Jul-11	0.0531	0.288	0.274	0.109	0.208	0.326	0.297	0.0252
Jan-12	0.0941	0.26	0.214	0.184	0.144	0.241	0.378	0.204
Jul-12	0.0326	0.185	0.215		0.188	0.236	0.352	0.209
Jan-13	0.0347	0.182	0.172	0.25	0.162	0.208	0.258	0.179
Jul-13	0.0888	0.235	0.198	0.249	0.197	0.296	0.398	0.202
Jan-14	0.0584	0.271	0.193	0.244	0.18	0.252	0.417	0.198
Jul-14	0.0337	0.297	0.18	0.31	0.158	0.304	0.488	0.166
Mar-15	0.178	0.372	0.164	0.36	0.145	0.328	0.432	dry
Jul-15	0.18	0.264	0.197	0.362	0.179	0.111	0.382	0.178
Jan-16	0.177	0.327	0.196	0.435	0.242	0.124	0.448	0.211
Jul-16	0.182	0.266	0.189	0.429	0.242	0.137	0.467	0.216
Jan-17	0.181	0.326	0.189	0.372	0.331	0.137	0.443	0.195
Jul-17	0.153	0.391	0.172	0.373	0.431	0.138	0.324	0.285
Jan-18	0.172	0.278	0.158	0.264	0.332	0.119	0.384	0.171
Jul-18	0.221	0.349	0.205	0.375	0.461	0.159	0.453	0.258
Jan-19	0.236	0.394	0.172	0.361	0.468	0.145	0.429	0.226
Jul-19	0.185	0.289	0.204	0.319	0.298	0.148	0.314	0.112
Jan-20	0.231	0.262	0.189	0.344	0.359	0.14	0.34	0.141
Jul-20	0.242	0.26	0.239	0.268	0.199	0.165	0.324	0.124
Jan-21	0.285	0.217	0.405	0.254	0.171	0.154	0.294	0.148
Jul-21	0.3580	0.1750	0.3660	0.2270	0.1100	0.1740	0.3870	0.1520
Jan-22	0.3100	0.0965	0.312	0.156	0.164	0.167	0.375	0.136
Jul-22		0.1530	0.2940	0.1940	0.1990	0.1550	0.3050	0.1530
Jan-23	0.4020	0.0887	0.3670	0.1830	0.3990	0.1600	0.3270	0.1690
Jul-23		0.0613	0.3280	0.1340	0.3900	0.1370	0.3200	0.1370
Jan-24		0.1020	0.3260	0.1270	0.3700	0.1520	0.2970	0.1520
# Data	56	87	87	86	63	87	87	87
# > MDL	55	86	85	85	62	83	84	82
# > PCL	4	19	17	29	0	14	13	2
BENZENETHIOL: $^{GW}GW_{CLASS\ 3}$ = 0.24 mg/L								
JAN-97		0.3600	0.6400	0.5500		0.2300	0.6900	0.4800
JUL-97		0.1800	0.3950	0.1100		0.0450	0.0240	0.0820
JAN-98		<0.50	0.5900	<0.50		<0.50	<0.50	<0.50
JUL-98		<0.28	<0.250	<0.250		<0.250	<0.250	<0.250
Jan-99		<0.25						
Jul-01		<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025
Jan-02	0.0730	<1.2	0.0690	0.0380	<0.5	0.0440	0.0810	<0.5
Jul-02	<2.5	<2.5	<2.5	<2.5	<1	<2.5	<2.5	<2.5
Jan-03		<2.5	<2.5	<2.5	<0.5	<2.5	<2.5	<0.5
Jul-03		<1	<1	<1	<1	<1	<1	<1
Jan-04		<1	<1	<1	<1	<1	2.2000	<0.25
Jul-04	<.02	<1	<1	<0.4	<0.2	<1	<1	0.3500
Jan-05	<1	<1	<1	<0.4	<2.5	<1	<1	<1
Jul-05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Jan-06	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Jul-06	<0.5	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Jan-07	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Jul-07	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Jul-08	<0.025	<0.25	<0.05	<0.025	<0.05	<0.5	<0.025	<0.025
Jan-09	<0.25	<0.25	<0.25	<0.025	<0.25	<0.25	<0.25	<0.1
Jan-13	0.0771	0.0938	0.1120	0.0928	0.0827	0.1260	0.1110	0.1950
Jul-13	0.0935	0.1270	0.1800	0.1710	0.2400	0.1360	0.1630	0.2360
Jan-14	0.1640	0.0453	0.1500	0.1980	0.1150	0.0898	0.1090	0.2650
Jul-14	0.0781	0.0693	0.1150	0.1570	0.0117	0.0769	0.1790	0.1640
Mar-15	0.0366	0.0869	0.0663	0.1100	0.0548	0.0800	0.0952	
Jul-15	0.1080	0.0996	0.1730	0.2740	0.1670	0.0821	0.2900	0.2180
Jan-16	0.0457	0.0525	0.1780	0.2930	0.2930	0.1010	0.2540	0.2820
Jul-16	0.0312	0.0810	0.0967	0.1010	0.0771	0.0447	0.0668	0.0849
Jan-17	0.0288	0.0810	0.0851	0.1920	0.1090	0.0492	0.0898	0.0775
Jul-17	0.0288	0.8490	0.0851	0.1920	0.1090	0.0492	0.8900	0.0775
Jan-18	0.0349	0.0629	0.1730	0.1800	0.1420	0.0759	0.1780	0.1770
Jul-18	0.0483	0.0575	0.1530	0.1450	0.1380	0.0734	0.1100	0.1400

SUPPLEMENTAL TABLE XI.B.[j]

SITE E HISTORICAL RESULTS

Well >	MW-38	MW-39	MW-40	MW-41	MW-38A	MW-39A	MW-40A	MW-41A
Sat. Zone >	U Sand	U Sand	U Sand	U Sand	L Gravel	L Gravel	L Gravel	L Gravel
Jan-19	0.0306	0.0502	0.1010	0.1270	0.0449	0.0608	0.0869	0.1050
Jul-19	0.0353	0.0708	0.1040	0.1990	0.0487	0.0778	0.1150	0.0461
Jan-20	0.0324	0.0584	0.0880	0.1390	0.0430	0.0682	0.0960	0.0703
Jul-20	0.0363	0.0683	0.0891	0.1800	0.0334	0.0268	0.0990	0.0657
Jan-21	0.0297	0.0882	0.1160	0.0995	0.0132	0.0290	0.0859	0.0634
Jul-21	0.0551	0.5010	0.1290	0.2860	0.0430	0.0606	0.0711	0.0744
Jan-22	0.0354	0.0921	0.1950	0.1500	0.0169	0.0597	0.1450	0.0647
Jul-22		0.0614	0.0591	0.1320	<0.00012	0.0375	<0.011	0.0247
Jan-23	0.0312	0.0341	0.0771	0.1080	0.0342	0.0150	0.0729	0.0193
Jul-23		0.3450	0.1550	0.1740	<0.0011	0.0368	0.1860	0.0699
Jan-24		0.0349	0.0784	0.1610	0.0376	0.0335	0.0540	0.0260
# Data	31	43	42	42	38	42	42	41
# > MDL	21	25	27	26	21	26	26	25
# > PCL	0	4	3	4	1	0	5	4
ETHYLBENZENE: $^{GW}GW_{CLASS\ 3}$ = 70.0 mg/L								
JAN-97		0.210	0.160	0.170		0.081	0.110	0.088
JUL-97		0.150	0.130	0.160		0.082	0.100	0.083
JAN-98		0.320	0.180	0.220		0.095	0.110	0.220
JUL-98		0.250	0.140	0.180		0.082	0.089	0.110
Jan-99		0.130						
Jan-01		0.220	0.160	0.140		0.130	0.180	0.100
Jul-01		0.230	0.160	0.100	0.120	0.120	0.084	<0.005
Jan-02	0.15	0.280	0.180	0.140	0.15	0.120	0.190	0.026
Jul-02	0.12	0.400	0.160	0.140	0.140	0.140	0.170	0.083
Jan-03		0.330	0.230	0.160	0.15	0.130	0.150	0.110
Jul-03		0.160	0.140	0.130	0.120	0.120	0.170	0.078
Jan-04		0.380	0.180	0.140	0.14	0.130	0.120	0.077
Jul-04	0.11	0.270	0.140	0.110	0.120	0.120	0.140	0.059
Jan-05	0.096	0.400	0.190	0.110	0.11	0.120	0.130	0.065
Jul-05	0.1	0.350	0.190	0.100	0.13	0.120	0.140	0.063
Jan-06	0.1	0.440	0.180	0.200	0.11	0.140	0.130	0.080
Jul-06	0.1	0.38	0.13	0.22	0.086	0.21	0.098	0.110
Jan-07	0.1	0.4	0.19	0.19	0.1	0.16	0.11	0.099
Jul-07	0.091	0.43	0.14	0.21	0.094	0.22	0.079	0.088
Jan-08	0.072	0.24	0.12	0.15	0.067	0.1	0.072	0.066
Jul-08	0.18	0.3	0.16	0.18	0.16	0.18	0.17	0.093
Jan-09	0.18	0.410	0.180	0.230	0.12	0.220	0.120	0.140
Jul-09	0.019	0.32	0.14	0.25	0.077	0.12	0.19	0.086
Jan-10	0.039	0.290	0.110	0.260	0.072	0.140	0.170	0.098
Jul-10	0.034	0.39	0.16	0.29	0.078	0.17	0.2	0.110
Jan-11	0.031	0.3	0.1	0.24	0.061	0.16	0.14	0.100
Jul-11	0.0228	0.169	0.105	0.0953	0.073	0.32	0.135	0.002
Jan-12	0.0501	0.252	0.102	0.24	0.0713	0.174	0.21	0.079
Jul-12	0.0119	0.177	0.12	DRY	0.0557	0.134	0.2	0.270
Jan-13	0.0138	0.104	0.102	0.323	0.0652	0.145	0.157	0.070
Jul-13	0.0314	0.192	0.148	0.309	0.0971	0.305	0.232	0.0835
Jan-14	0.0222	0.237	0.129	0.273	0.0847	0.171	0.235	0.066
Jul-14	0.011	0.261	0.154	0.356	0.0854	0.191	0.258	0.051
Mar-15	0.0737	0.323	0.161	0.437	0.0992	0.181	0.284	dry
Jul-15	0.0564	0.172	0.113	0.308	0.0697	0.0748	0.191	0.0592
Jan-16	0.0621	0.188	0.147	0.368	0.0564	0.0935	0.239	0.072
Jul-16	0.0717	0.133	0.151	0.32	0.0608	0.0939	0.232	0.0738
Jan-17	0.0718	0.173	0.14	0.274	0.0773	0.103	0.244	0.070
Jul-17	0.0718	0.173	0.14	0.274	0.0773	0.103	0.244	0.0697
Jan-18	0.0642	0.142	0.11	0.205	0.0762	0.0887	0.223	0.068
Jul-18	0.0793	0.114	0.156	0.256	0.0814	0.105	0.226	0.093
Jan-19	0.0792	0.166	0.131	0.252	0.0965	0.124	0.197	0.085
Jul-19	0.0578	0.121	0.178	0.261	0.066	0.14	0.169	0.057
Jan-20	0.0707	0.138	0.119	0.265	0.0824	0.123	0.18	0.074
Jul-20	0.0777	0.148	0.146	0.252	0.0867	0.139	0.172	0.079
Jan-21	0.0747	0.138	0.225	0.24	0.0878	0.104	0.158	0.090
Jul-21	0.0771	0.121	0.161	0.199	0.0764	0.103	0.177	0.081

SUPPLEMENTAL TABLE XI.B.[j]

SITE E HISTORICAL RESULTS

Well >	MW-38	MW-39	MW-40	MW-41	MW-38A	MW-39A	MW-40A	MW-41A
Sat. Zone >	U Sand	U Sand	U Sand	U Sand	L Gravel	L Gravel	L Gravel	L Gravel
Jan-22	0.0676	0.12	0.138	0.128	0.0737	0.101	0.22	0.078
Jul-22		0.185	0.124	0.148	0.0848	0.0979	0.185	0.082
Jan-23	0.0834	0.137	0.158	0.159	0.0889	0.0992	0.207	0.103
Jul-23		0.102	0.132	0.105	0.0992	0.0739	0.199	0.074
Jan-24		0.137	0.157	0.137	0.101	0.0886	0.182	0.080
# Data	39	52	51	51	46	51	51	51
# > MDL	39	52	51	50	46	51	51	49
# > PCL	0	0	0	0	0	0	0	0
TOLUENE: $^{GW}GW_{CLASS\ 3}$ = 100.0 mg/L								
JAN-97		1.000	0.360	0.160		0.150	0.310	0.120
JUL-97		0.660	0.370	0.170		0.200	0.350	0.100
JAN-98		1.000	0.470	0.180		0.120	0.390	0.180
JUL-98		0.700	0.300	0.150		0.240	0.310	<0.089
Jan-99		0.500						
Jan-01		0.300	0.310	0.074		0.250	0.950	0.038
Jul-01		0.300	0.380	0.052	0.039	0.190	0.360	<0.005
Jan-02	0.037	0.360	0.440	0.083	0.07	0.240	0.820	0.014
Jul-02	0.029	0.400	0.460	0.100	0.057	0.300	0.740	0.036
Jan-03		0.320	0.550	0.110	0.056	0.260	0.530	0.042
Jul-03		0.170	0.270	0.077	0.040	0.180	0.500	0.029
Jan-04		0.300	0.450	0.080	0.049	0.300	0.510	0.031
Jul-04	<0.05	0.210	0.340	0.067	0.044	0.260	0.480	0.028
Jan-05	0.034	0.300	0.330	0.065	0.046	0.270	0.340	0.031
Jul-05	0.031	0.230	0.430	0.060	0.055	0.200	0.320	0.045
Jan-06	0.027	0.240	0.520	0.120	0.065	0.200	0.250	0.180
Jul-06	0.032	0.24	0.21	0.082	0.067	0.18	0.19	0.250
Jan-07	0.033	0.28	0.5	0.072	0.068	0.3	0.15	0.170
Jul-07	0.03	0.27	0.36	0.067	0.049	0.34	0.094	0.110
Jan-08	0.03	0.3	0.33	0.064	0.043	0.11	0.067	0.088
Jul-08	0.042	0.29	0.37	0.085	0.053	0.19	0.14	0.080
Jan-09	0.39	0.250	0.370	0.095	0.046	0.230	0.140	0.110
Jul-09	0.0087	0.23	0.25	0.071	0.037	0.098	0.18	0.086
Jan-10	0.014	0.190	0.140	0.074	0.033	0.100	0.200	0.091
Jul-10	0.016	0.26	0.21	0.057	0.036	0.11	0.33	0.097
Jan-11	0.013	0.16	0.12	0.048	0.027	0.16	0.21	0.092
Jul-11	0.0112	0.132	0.141	0.0192	0.0683	0.226	0.178	0.005
Jan-12	0.0201	0.203	0.112	0.0448	0.0362	0.13	0.369	0.102
Jul-12	0.0057	0.153	0.118	DRY	0.0466	0.106	0.322	0.045
Jan-13	0.0065	0.0993	0.0977	0.0465	0.0355	0.112	0.181	0.087
Jul-13	0.0142	0.119	0.112	0.0552	0.0495	0.201	0.35	0.0992
Jan-14	0.0106	0.166	0.0845	0.5	0.0419	0.12	0.373	0.083
Jul-14	0.0057	0.161	0.073	0.0554	0.0406	0.129	0..393	0.0666
Mar-15	0.0359	0.188	0.0652	0.0575	0.0413	0.116	0.431	dry
Jul-15	0.0359	0.188	0.0652	0.0575	0.0413	0.116	0.431	dry
Jan-16	0.0295	0.12	0.0745	0.0463	0.0412	0.0377	0.323	0.082
Jul-16	0.0342	0.1270	0.0746	0.0540	0.0423	0.0454	0.3790	0.0875
Jan-17	0.0405	0.0828	0.0751	0.0459	0.0430	0.0484	0.4010	0.0824
Jul-17	0.0417	0.1170	0.0646	0.0476	0.0582	0.0518	0.4030	0.0845
Jan-18	0.0386	0.0911	0.0462	0.0351	0.0550	0.0451	0.3490	0.0731
Jul-18	0.0500	0.0630	0.0614	0.0448	0.0636	0.0552	0.3650	0.1200
Jan-19	0.0507	0.1070	0.0661	0.0417	0.0166	0.0584	0.3220	0.1010
Jul-19	0.0369	0.0737	0.0778	0.0450	0.0482	0.0596	0.2580	0.0392
Jan-20	0.0511	0.0674	0.0661	0.0398	0.0617	0.0631	0.2660	0.0565
Jul-20	0.0533	0.0644	0.0912	0.0344	0.0448	0.0526	0.2340	0.0418
Jan-21	0.0544	0.0478	0.2960	0.0315	0.0379	0.0474	0.1150	0.0488
Jul-21	0.0692	0.0403	0.1640	0.0295	0.0297	0.0443	0.2500	0.0451
Jan-22	0.0648	0.0306	0.1430	0.0225	0.0345	0.0386	0.2440	0.0423
Jul-22		0.0570	0.1350	0.0317	0.0438	0.0331	0.2150	0.0404
Jan-23	0.0820	0.0428	0.1870	0.0370	0.0729	0.0355	0.2220	0.0484
Jul-23		0.0421	0.1720	0.0308	0.0668	0.0316	0.2370	0.0404
Jan-24		0.0357	0.1840	0.0367	0.0723	0.0382	0.2330	0.0477
# Data	39	52	51	51	46	51	51	51

SUPPLEMENTAL TABLE XI.B.[j]

SITE E HISTORICAL RESULTS

Well >	MW-38	MW-39	MW-40	MW-41	MW-38A	MW-39A	MW-40A	MW-41A
Sat. Zone >	U Sand	U Sand	U Sand	U Sand	L Gravel	L Gravel	L Gravel	L Gravel
# > MDL	38	52	51	50	46	51	50	47
# > PCL	0	0	0	0	0	0	0	0
XYLENES: $^{GW}GW_{CLASS\ 3}$ = 1000 mg/L								
JAN-97		0.3000	0.3300	0.3000		0.0740	0.1400	0.0440
JUL-97		0.1700	0.2300	0.2100		0.0600	0.1100	0.1100
JAN-98		0.3300	0.2800	0.2900		0.0860	0.1100	0.2900
JUL-98		0.2500	0.2200	0.2400		0.0770	0.0900	0.1400
Jan-99		0.1400						
Jan-01		0.5250	0.2370	0.1280		0.1510	0.2030	0.0800
Jul-01		0.2490	0.2400	0.0940	0.0640	0.1400	0.0830	<0.005
Jan-02	0.0750	0.3700	0.2700	0.1290	0.0980	0.1470	0.2170	0.0190
Jul-02	0.0600	0.4300	0.2420	0.1420	0.0860	0.1650	0.2020	0.0620
Jan-03		0.3200	0.3000	0.1490	0.0820	0.1530	0.1690	0.0770
Jul-03		0.2380	0.2110	0.1240	0.0630	0.1400	0.2500	0.0530
Jan-04		0.3900	0.2580	0.1270	0.0670	0.1470	0.1390	0.0490
Jul-04	<0.05	0.3500	0.2100	0.0970	0.0580	0.1430	0.1820	0.0370
Jan-05	0.0590	0.3700	0.2700	0.0940	0.0570	0.1330	0.1490	0.0420
Jul-05	0.0640	0.3900	0.2700	0.1000	0.0720	0.1280	0.1630	0.0460
Jan-06	0.0560	0.4200	0.2670	0.2060	0.0710	0.1460	0.1570	0.0850
Jul-06	0.0610	0.3800	0.1930	0.2110	0.0650	0.2280	0.1170	0.1280
Jan-07	0.0650	0.3600	0.2700	0.1520	0.0730	0.1570	0.1240	0.1160
Jul-07	0.0580	0.4700	0.1900	0.1770	0.0550	0.2460	0.0890	0.0990
Jan-08	0.0500	0.2300	0.1760	0.1250	0.0460	0.0940	0.0830	0.0700
Jul-08	0.1070	0.3100	0.3200	0.3100	0.0930	0.3600	0.1880	0.0950
Jan-09	0.0870	0.4100	0.2700	0.3800	0.0640	0.2240	0.1330	0.1560
Jul-09	0.0147	0.3300	0.2070	0.2140	0.0440	0.1150	0.2130	0.0830
Jan-10	0.0280	0.2640	0.1580	0.2740	0.0380	0.1340	0.1920	0.0920
Jul-10	0.0280	0.3100	0.2320	0.2020	0.0410	0.1510	0.2410	0.1020
Jan-11	0.0207	0.2220	0.1490	0.1860	0.0330	0.1610	0.1540	0.0890
Jul-11	0.0183	0.2050	0.1900	0.0835	0.0954	0.3050	0.1790	0.0023
Jan-12	0.0336	0.2410	0.1400	0.2200	0.0473	0.1630	0.2820	0.0829
Jul-12	0.0097	0.1650	0.1590		0.0611	0.1270	0.2780	0.2400
Jan-13	0.0126	0.0975	0.1270	0.3090	0.0484	0.1450	0.1980	0.0795
Jul-13	0.0247	0.1860	0.1560	0.2910	0.0791	0.3090	0.3380	0.0986
Jan-14	0.0165	0.1850	0.1020	0.2300	0.0551	0.1750	0.2850	0.0727
Jul-14	0.0089	0.2020	0.1030	0.3340	0.0551	0.2030	0.3720	0.0582
Mar-15	0.0468	0.2740	0.1110	0.3070	0.0622	0.1770	0.3650	
Jul-15	0.0468	0.2740	0.1110	0.3070	0.0622	0.1770	0.3650	
Jan-16	0.0364	0.1300	0.0851	0.2390	0.0507	0.0709	0.2840	0.0703
Jul-16	0.0405	0.1430	0.0988	0.2710	0.0408	0.0863	0.2950	0.0833
Jan-17	0.0443	0.0911	0.0942	0.2030	0.0395	0.0815	0.2590	0.0765
Jul-17	0.0500	0.1400	0.0967	0.2160	0.0591	0.0979	0.2890	0.0832
Jan-18	0.0386	0.0911	0.0462	0.0351	0.0550	0.0451	0.3490	0.0731
Jul-18	0.0500	0.0630	0.0614	0.0448	0.0636	0.0552	0.3650	0.1200
Jan-19	0.0591	0.1240	0.1170	0.1590	0.0696	0.1100	0.2550	0.0986
Jul-19	0.0448	0.0857	0.1100	0.1570	0.0463	0.1160	0.2110	0.0375
Jan-20	0.0568	0.0962	0.0837	0.1400	0.0582	0.1050	0.2310	0.0570
Jul-20	0.0581	0.0944	0.1060	0.1280	0.0463	0.0956	0.2120	0.0462
Jan-21	0.0573	0.0823	0.2640	0.1160	0.0405	0.0660	0.1190	0.0530
Jul-21	0.0683	0.0833	0.1540	0.1270	0.0416	0.0734	0.2220	0.0485
Jan-22	0.0563	0.0670	0.1340	0.0656	0.0369	0.0572	0.2670	0.0453
Jul-22		0.1050	0.1190	0.0821	0.0406	0.0530	0.2520	0.0462
Jan-23	0.0694	0.0777	0.1680	0.0819	0.0599	0.0542	0.2480	0.0566
Jul-23		0.0616	0.1550	0.0558	0.0663	0.0420	0.2430	0.0432
Jan-24		0.0872	0.1870	0.0758	0.0672	0.0515	0.2270	0.0504
# Data	39	52	51	50	46	51	51	49
# > MDL	38	52	51	50	46	51	51	48
# > PCL	0	0	0	0	0	0	0	0
1-METHYLNAPHTHALENE: $^{GW}GW_{CLASS\ 3}$ = 3.1 mg/L								
Jul-01		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Jan-02	0.0900	<0.05	0.0530	0.1000	0.1400	<0.05	<0.1	0.0680

SUPPLEMENTAL TABLE XI.B.[j]

SITE E HISTORICAL RESULTS

Well >	MW-38	MW-39	MW-40	MW-41	MW-38A	MW-39A	MW-40A	MW-41A
Sat. Zone >	U Sand	U Sand	U Sand	U Sand	L Gravel	L Gravel	L Gravel	L Gravel
Jul-02	<0.1	<0.1	<0.1	<0.1	**0.0920**	<0.1	<0.1	<0.1
Jan-03		**0.0120**	**0.0240**	**0.0460**	**0.1100**	**0.0210**	**0.0120**	**0.0510**
Jul-03		<0.04	<0.04	**0.0930**	**0.1200**	<0.04	<0.04	**0.0760**
Jan-04		<0.04	<0.04	**0.0810**	**0.1000**	<0.04	<0.04	**0.0380**
Jul-04	<0.2	<0.1	<0.1	**0.0970**	**0.0980**	<0.1	<0.1	**0.0640**
Jan-05	**0.1000**	<0.1	<0.1	**0.1000**	**0.1000**	<0.1	<0.1	<0.1
Jul-05	<0.1	<0.1	<0.1	<0.1	**0.1100**	<0.1	<0.1	<0.1
Jan-06	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Jul-06	**0.0950**	<0.05	<0.05	**0.0990**	**0.1100**	<0.05	<0.05	**0.0600**
Jan-07	<0.1	<0.1	<0.1	**0.1000**	<0.1	<0.1	<0.1	<0.1
Jul-07	<0.1	<0.1	<0.1	<0.1	**0.10**	<0.1	<0.05	<0.1
Jan-08	**0.1200**	<0.05	<0.05	**0.1300**	**0.1300**	<0.05	**0.0260**	**0.0630**
Jul-08	**0.1100**	<0.05	<0.05	**0.1200**	**0.0700**	<0.1	<0.05	**0.0510**
Jan-09	**0.0650**	<0.05	<0.05	**0.1300**	**0.1300**	<0.05	<0.05	**0.0360**
Jul-09	**0.0820**	<0.04	<0.04	**0.0940**	**0.0840**	<0.04	<0.04	<0.04
Jan-10	**0.1100**	<0.053	<0.052	**0.1500**	**0.1200**	<0.056	<0.052	**0.0670**
Jul-10	**0.1200**	<0.051	<0.054	**0.1600**	**0.1400**	<0.05	<0.05	**0.0750**
Jan-11	**0.1000**	<0.025	**0.0440**	**0.1800**	**0.1400**	<0.02	**0.0260**	**0.0680**
Jul-11	**0.0968**	<0.022	**0.0567**	**0.0156**	**0.1450**	**0.0325**	**0.2480**	**0.0759**
Jan-12	**0.0852**	**0.0195**	**0.0408**	**0.1470**	**0.0925**	**0.0058**	**0.0174**	**0.0416**
Jul-12	**0.0686**	**0.0122**	**0.0534**	DRY	**0.0339**	**0.1610**	**0.0271**	**0.1420**
Jan-13	**0.0797**	**0.0334**	**0.0466**	**0.1560**	**0.1310**	**0.0123**	**0.0237**	**0.0627**
Jul-13	**0.0659**	**0.0145**	**0.0555**	**0.1360**	**0.1570**	**0.0472**	**0.0250**	**0.1270**
Jan-14	**0.0826**	**0.0313**	**0.0684**	**0.1540**	**0.1750**	**0.0145**	**0.0263**	**0.0397**
Jan-21	**0.0840**	**0.0393**	**0.0416**	**0.0902**	**0.1480**	**0.0280**	**0.0708**	**0.0495**
Jan-22	**0.0779**	**0.0434**	**0.1150**	**0.0915**	**0.1730**	**0.0306**	**0.0722**	**0.0514**
Jul-22		**0.0202**	**0.0640**	**0.1080**	**0.1740**	**0.0278**	**0.0434**	**0.0413**
Jan-23	**0.0796**	**0.0443**	<0.00026	**0.0940**	**0.1610**	**0.0225**	**0.0542**	**0.0465**
Jan-24		**0.0119**	0.1050	**0.1120**	**0.2050**	**0.0303**	**0.0632**	**0.0527**
# Data	**25**	**31**	**31**	**31**	**31**	**31**	**31**	**31**
# > MDL	**19**	**11**	**13**	**25**	**27**	**12**	**14**	**23**
# > PCL	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
2-METHYLNAPHTHALENE: $^{GW}GW_{CLASS\ 3}$ = 9.8 mg/L								
Jul-01		**0.2000**	<0.1	**0.0250**	**11.0000**	<0.1	<0.1	<0.1
Jan-02	**0.0290**	**0.1600**	<0.05	<0.05	**0.0560**	<0.1	**0.0340**	<0.02
Jul-02	<0.1	**0.1000**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Jan-03		**0.1300**	<0.01	<0.1	<0.1	<0.1	<0.1	<0.02
Jul-03		**0.1300**	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Jan-04		**0.0950**	<0.04	<0.04	<0.04	<0.04	<0.04	<0.01
Jul-04	<0.2	**0.0390**	<0.1	<0.04	<0.1	<0.1	<0.04	<0.01
Jan-05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.01
Jul-05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Jan-06	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Jul-06	<0.1	<0.05	<0.05	<0.05	<0.5	<0.05	**0.1100**	<0.05
Jan-07	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**0.1200**	<0.1
Jul-07	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	<0.1	<0.1
Jan-08	<0.01	<0.01	<0.05	<0.05	<0.05	**0.0250**	**0.1300**	<0.1
Jul-08	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	**0.1200**	<0.05
Jan-09	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	**0.1300**	<0.02
Jul-09	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	**0.0700**	<0.04
Jan-10	<0.054	<0.052	<0.053	<0.056	<0.052	<0.052	**0.0830**	<0.052
Jul-10	<0.054	<0.052	<0.051	<0.05	<0.054	<0.05	<0.051	<0.051
Jan-11	<0.02	<0.02	<0.025	<0.02	**0.0280**	**0.0250**	<0.02	<0.02
Jul-11	<0.026	<0.026	<0.026	<0.026	<0.026	<0.026	<0.0052	<0.026
Jan-12	<0.0013	**0.0066**	**0.0148**	**0.0054**	**0.0118**	**0.0159**	<0.0013	**0.0122**
Jul-12	<0.0013	**0.0228**	**0.0084**	<0.0052	**0.0154**	**0.0242**	DRY	<0.0052
Jan-13	<0.0048	**0.0087**	**0.0253**	**0.0088**	**0.0073**	**0.0202**	<0.0048	<0.0048
Jul-13	<0.0048	**0.0080**	**0.0118**	**0.0395**	<0.0048	**0.0247**	<0.0048	<0.0048
Jan-14	<0.0052	**0.0086**	**0.0252**	**0.0116**	<0.0052	**0.0250**	<0.005	<0.005
Jan-21	<0.0013	<0.0013	**0.0027**	**0.0255**	**0.0029**	<0.0013	<0.0013	**0.0218**
Jan-22	<0.0048	<0.0049	**0.0326**	**0.0279**	<0.0096	**0.0049**	<0.0048	**0.0276**
Jul-22		<0.000061	**0.0137**	**0.0266**	<0.00006	**0.0012**	<0.00006	**0.0233**

SUPPLEMENTAL TABLE XI.B.[j]

SITE E HISTORICAL RESULTS

Well >	MW-38	MW-39	MW-40	MW-41	MW-38A	MW-39A	MW-40A	MW-41A
Sat. Zone >	U Sand	U Sand	U Sand	U Sand	L Gravel	L Gravel	L Gravel	L Gravel
Jan-23	<0.00032	<0.00032	<0.00032	**0.0208**	<0.00032	<0.00032	<0.00032	**0.0272**
Jan-24		0.0010	0.0084	**0.0286**	<0.012	<0.0061	<0.00061	**0.0326**
# Data	**25**	**31**	**31**	**31**	**31**	**31**	**31**	**31**
# > MDL	**1**	**13**	**9**	**10**	**7**	**9**	**8**	**6**
# > PCL	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**
2,4-DIMETHYLPHENOL: $^{GW}GW_{CLASS\ 3}$ = 49 mg/L								
Jul-01		**3.000**	**11.000**	**0.890**	**0.800**	**7.000**	**9.700**	**0.400**
Jan-02	**2.000**	**3.600**	**9.100**	**0.860**	**1.400**	**3.600**	**11.000**	**0.490**
Jul-02	**1.500**	**5.600**	**18.000**	**1.900**	**0.250**	**6.200**	**8.100**	**1.000**
Jan-03		**2.500**	**6.900**	**0.990**	**0.110**	**4.200**	**5.800**	**0.290**
Jul-03		**2.800**	**16.000**	**1.600**	**0.190**	**9.200**	**11.000**	**0.360**
Jan-04		**1.100**	**5.500**	**0.320**	**0.093**	**2.900**	**15.000**	**0.057**
Jul-04	**1.200**	**2.200**	**11.000**	**0.850**	**0.040**	**5.900**	**3.800**	**0.093**
Jan-05	**1.700**	**2.900**	**12.000**	**1.100**	**0.450**	**4.000**	**7.100**	**0.260**
Jul-05	**0.890**	**1.400**	**12.000**	**0.760**	**0.880**	**1.800**	**7.700**	**2.700**
Jan-06	**0.210**	**1.300**	**3.700**	**2.500**	**0.770**	**2.800**	**3.000**	**2.600**
Jul-06	<0.5	**0.610**	**5.900**	**2.200**	**1.400**	**3.200**	**4.000**	**4.300**
Jan-07	**1.000**	**2.000**	**15.000**	**1.700**	**1.400**	**4.700**	**6.300**	**4.400**
Jul-07	**1.000**	**2.100**	**20.000**	**1.600**	**0.340**	**2.900**	**2.800**	**2.700**
Jan-08	**0.490**	**1.000**	**8.300**	**0.300**	**0.170**	**0.380**	**3.000**	**0.830**
Jul-08	**1.500**	**2.600**	**14.000**	**2.300**	**0.250**	**2.700**	**4.800**	**3.400**
Jan-09	**0.860**	**3.300**	**13.000**	**1.900**	**0.380**	**3.300**	**1.500**	**1.800**
Jul-09	**1.200**	**1.900**	**7.200**	**1.400**	**0.140**	**1.400**	**3.000**	**1.500**
Jan-10	**0.840**	**3.200**	**13.000**	**1.500**	**0.180**	**2.200**	**5.200**	**3.100**
Jul-10	**1.000**	**2.600**	**8.800**	**1.300**	**0.310**	**2.000**	**4.000**	**2.800**
Jan-11	**0.400**	**1.900**	**6.900**	**0.800**	**0.360**	**3.600**	**3.200**	**2.200**
Jul-11	**0.392**	**2.650**	**4.200**	**0.551**	**2.800**	**2.590**	**2.900**	**2.770**
Jan-12	**0.183**	**1.970**	**3.670**	**0.652**	**0.410**	**2.120**	**4.150**	**4.270**
Jul-12	**0.119**	**2.180**	**3.730**	DRY	**1.720**	**2.790**	**3.700**	**0.811**
Jan-13	**0.321**	**1.360**	**2.780**	**0.697**	**0.668**	**1.810**	**3.020**	**3.740**
Jul-13	**0.058**	**2.290**	**3.230**	**1.760**	**1.120**	**1.700**	**4.810**	**3.280**
Jan-14	**0.111**	**0.838**	**2.220**	**0.972**	**0.771**	**0.782**	**3.790**	**2.460**
Jan-21	**0.035**	**0.290**	**3.160**	**0.224**	**0.089**	**0.294**	**1.840**	**0.269**
Jan-22	**0.024**	**0.203**	**2.180**	**0.081**	**0.068**	**0.086**	**2.500**	**0.201**
Jul-22		**0.305**	**4.420**	**0.178**	**0.076**	**0.108**	**4.180**	**0.213**
Jan-23	**0.040**	**0.053**	**5.370**	**0.178**	**0.059**	**0.107**	**3.520**	**0.190**
Jan-24		**0.154**	**7.700**	**0.434**	**0.470**	**0.215**	**4.250**	**0.603**
# Data	**25**	**31**	**31**	**31**	**31**	**31**	**31**	**31**
# > MDL	**24**	**31**	**31**	**30**	**31**	**31**	**31**	**31**
# > PCL	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
ACETONE: $^{GW}GW_{CLASS\ 3}$ = 2200 mg/L								
Jul-01		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Jan-02	<0.1	<0.1	<0.1	<0.1	**0.180**	**0.570**	<0.1	<0.1
Jul-02	<0.1	<0.1	<0.1	<0.1	**0.390**	<0.1	<0.1	<0.1
Jan-03		<0.1	**0.160**	<0.1	**0.290**	**0.340**	<0.1	<0.1
Jul-03		<0.1	**0.120**	<0.1	**0.140**	**0.490**	<0.1	<0.1
Jan-04		<0.1	<0.1	<0.1	**0.140**	**0.170**	<0.1	<0.01
Jul-04	<1	<0.1	<0.1	<0.1	<0.1	**0.110**	<0.1	<0.01
Jan-05	<0.1	<0.1	<0.1	<0.1	**0.160**	**<0.1**	<0.1	<0.01
Jul-05	<0.1	<0.1	<0.1	<0.1	**0.240**	**<0.1**	<0.1	<0.1
Jan-06	<0.1	<0.1	<0.1	<0.1	**0.290**	**0.120**	<0.1	<0.1
Jul-06	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Jan-07	<0.1	<0.1	<0.01	<0.1	<0.1	<0.1	<0.1	<0.1
Jul-07	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Jan-08	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Jul-08	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Jan-09	<0.1	<0.1	<0.5	<0.5	<0.5	<0.5	<0.1	<0.1
Jul-09	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Jan-10	<0.1	<0.1	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1
Jul-10	**0.013**	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012
Jan-11	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

SUPPLEMENTAL TABLE XI.B.[j]

SITE E HISTORICAL RESULTS

Well >	MW-38	MW-39	MW-40	MW-41	MW-38A	MW-39A	MW-40A	MW-41A
Sat. Zone >	U Sand	U Sand	U Sand	U Sand	L Gravel	L Gravel	L Gravel	L Gravel
Jul-11	0.056	0.020	0.019	0.018	0.022	0.020	0.016	0.042
Jan-12	0.023	0.062	<0.01	<0.01	<0.01	<0.01	<0.010	<0.01
Jul-12	0.025	0.018	0.020	<0.01	<0.010	0.016	DRY	<0.010
Jan-13	0.027	0.066	<0.010	<0.010	<0.010	0.019	<0.010	0.045
Jul-13	0.0298	0.0355	0.0261	0.0323	0.0153	0.0267	0.0165	0.0201
Jan-14	0.0118	0.0357	0.0139	0.0142	0.023	0.0261	0.0196	0.0118
Jan-21	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.050	<0.10
Jan-22	0.0216	<0.250	<0.500	0.0149	0.0251	<0.500	<0.250	<0.500
Jul-22		<0.0011	0.0234	<0.0011	<0.0057	<0.0057	<0.0011	<0.0011
Jan-23	0.0121	0.0258	0.0226	0.0123	0.0167	0.0324	0.0049	0.0098
Jan-24		<0.0057	<0.0011	0.0229	<0.0057	0.0208	0.0073	0.0118
# Data	25	31	31	31	31	31	31	31
# > MDL	9	7	8	6	13	13	5	6
# > PCL	0	0	0	0	0	0	0	0
CARBON DISULFIDE: $^{GW}GW_{CLASS\ 3}$ = 240 mg/L								
Jul-01		<0.005	<0.005	<0.005	<0.005	<0.005	0.005	<0.005
Jan-02	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.005	<0.005
Jul-02	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.006	<0.005
Jan-03		<0.005	<0.005	<0.005	<0.005	<0.005	0.011	<0.005
Jul-03		<0.005	<0.005	<0.005	<0.005	<0.005	0.006	<0.005
Jan-04		<0.005	<0.005	<0.005	<0.005	<0.005	0.009	<0.005
Jul-04	<0.05	<0.005	<0.005	<0.005	<0.005	<0.005	0.010	<0.005
Jan-05	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.010	<0.005
Jul-05	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.009	<0.005
Jan-06	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.006	<0.005
Jul-06	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.007	<0.005
Jan-07	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.006	<0.005
Jul-07	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.006	<0.005
Jan-08	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.005	<0.005
Jul-08	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.007	<0.005
Jan-09	<0.005	<0.025	<0.025	<0.005	<0.005	<0.025	<0.025	<0.005
Jul-09	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.008	<0.005
Jan-10	<0.005	<0.025	<0.005	<0.005	<0.005	<0.005	0.007	<0.005
Jul-10	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Jan-11	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Jul-11	<0.00036	0.0016	0.0009	<0.00036	0.0005	<0.00036	0.0050	<0.00036
Jan-12	<0.00036	0.0025	0.0016	<0.001	0.0013	0.003	0.0045	0.0023
Jul-12	<0.00036	0.0013	0.0007	DRY	<0.00036	0.001	0.0045	<0.00036
Jan-13	<0.00036	0.0009	0.0007	<0.00036	0.000	0.001	0.0038	0.0011
Jul-13	<0.00036	0.0017	0.00095	<0.00036	0.00043	0.0019	0.0034	0.0015
Jan-14	<0.00036	0.0016	0.00075	<0.00036	0.0004	0.0022	0.0041	0.0015
Jan-21	<0.010	<0.010	<0.010	<0.005	<0.010	<0.010	<0.010	<0.010
Jan-22	<0.010	<0.050	<0.010	<0.025	<0.025	<0.005	<0.050	<0.050
Jul-22		<0.00027	<0.0014	<0.00027	<0.00027	<0.00027	0.0013	0.0011
Jan-23	<0.00027	0.0006	<0.0014	<0.00027	<0.0014	0.0012	<0.0014	0.0011
Jan-24		<0.00027	<0.0014	<0.00027	<0.0014	<0.00027	<0.0014	<0.00027
# Data	25	31	31	31	31	31	31	31
# > MDL	0	7	6	0	5	6	24	6
# > PCL	0	0	0	0	0	0	0	0
CRESOL, total: $^{GW}GW_{CLASS\ 3}$ = 120 mg/L								
Jul-01		1.900	13.000	0.900	0.160	0.590	18.600	0.095
Jan-02	2.800	1.700	21.000	2.600	2.200	<1	29.000	0.810
Jul-02	2.000	1.400	26.900	2.200	0.150	<2	15.800	0.260
Jan-03		0.730	11.600	1.100	0.057	0.306	12.500	0.034
Jul-03		2.240	25.900	2.070	0.073	0.990	13.800	0.076
Jan-04		0.460	12.000	0.910	<0.04	0.140	12.000	<0.01
Jul-04	1.700	0.940	17.750	0.750	<0.02	0.290	6.100	<0.01
Jan-05	3.000	0.570	16.000	0.780	0.560	0.220	5.300	<0.01
Jul-05	1.400	0.610	19.680	0.370	1.100	0.190	5.400	0.390
Jan-06	0.860	0.430	10.170	1.100	0.460	0.300	2.820	0.170
Jul-06	1.400	0.410	14.730	0.970	1.200	0.580	1.390	0.320

SUPPLEMENTAL TABLE XI.B.[j]

SITE E HISTORICAL RESULTS

Well >	MW-38	MW-39	MW-40	MW-41	MW-38A	MW-39A	MW-40A	MW-41A
Sat. Zone >	U Sand	U Sand	U Sand	U Sand	L Gravel	L Gravel	L Gravel	L Gravel
Jan-07	1.700	0.210	25.910	0.740	0.660	0.930	1.190	0.110
Jul-07	1.900	0.420	32.560	0.410	<0.1	0.450	0.290	<0.1
Jan-08	3.339	0.470	27.600	0.345	0.300	0.277	0.540	0.105
Jul-08	2.800	0.280	17.660	0.220	0.071	0.160	0.380	0.054
Jan-09	1.500	0.430	16.540	0.230	0.094	0.219	0.126	0.029
Jul-09	2.300	0.229	12.380	0.142	0.062	0.105	0.200	0.046
Jan-10	1.100	0.319	4.750	0.120	0.089	0.100	0.137	<0.052
Jul-10	1.900	0.373	1.100	0.210	0.410	0.100	0.162	<0.051
Jan-11	0.320	0.294	0.550	0.041	0.743	0.077	0.164	0.066
Jul-11	0.2840	0.0635	0.2480	0.0257	4.8681	0.1490	0.1452	0.0315
Jan-12	0.004	0.021	0.085	0.007	0.019	0.028	0.046	0.083
Jul-12	0.003	0.021	0.089	DRY	0.024	0.087	0.055	0.009
Jan-13	0.005	0.012	0.065	0.006	0.027	0.016	0.053	0.013
Jul-13	<0.0048	0.0886	0.1709	0.023	0.3222	0.134	0.0841	0.0301
Jan-14	0.0098	0.1033	0.1933	0.0161	0.1266	0.0779	0.0966	0.0215
Jan-21	0.0058	0.0184	0.0346	0.0031	0.0055	0.0698	0.0123	0.0755
Jan-22	0.0045	0.0125	0.0155	0.0013	0.004	0.0431	0.0281	0.0701
Jul-22		<0.000027	0.0153	0.0080	<0.000028	0.0684	0.0472	0.0782
Jan-23	0.0040	0.0022	0.0485	<0.0020	0.0040	0.0514	0.0644	0.0670
Jan-24		0.0098	0.0470	0.0069	0.0098	0.0586	0.0324	0.0506
# Data	25	31	31	31	31	31	31	31
# > MDL	24	30	31	29	27	29	31	25
# > PCL	0	0	0	0	0	0	0	0
METHYL ETHYL KETONE: $^{GW}GW_{CLASS\ 3}$ = 1500 mg/L								
Jul-01		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Jan-02	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.120	<0.1
Jul-02	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Jan-03		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Jul-03		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Jan-04		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.01
Jul-04	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.01
Jan-05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.01
Jul-05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Jan-06	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Jul-06	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Jan-07	<0.1	<0.01	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Jul-07	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Jan-08	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Jul-08	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Jan-09	<0.1	<0.5	<0.5	<0.1	<0.1	<0.5	<0.5	<0.1
Jul-09	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Jan-10	<0.1	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Jul-10	<0.012	<0.012	<0.012	<0.012	<0.012	0.023	<0.012	<0.012
Jan-11	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Jul-11	0.0136	0.002	0.0021	.<0.0018	<0.0018	0.0028	0.0036	<0.0018
Jan-12	<0.0018	<0.0018	<0.0018	0.0051	0.019	<0.0018	<0.0018	<0.0018
Jul-12	0.0075	0.005	0.0021	DRY	0.0049	<0.0018	0.0032	0.0032
Jan-13	0.0053	0.0064	0.0036	0.0041	0.0347	0.0046	0.0089	<0.0027
Jul-13	0.0081	0.0065	<0.0027	0.0061	0.0163	0.0082	0.0072	0.0046
Jan-14	0.003	<0.0027	0.0057	0.0054	0.0157	0.0033	0.0076	<0.0027
Jan-21	<0.017	<0.017	<0.017	<0.0083	<0.017	<0.017	<0.017	<0.017
Jan-22	0.0049	<0.100	0.0055	0.0097	0.009	0.0229	<0.100	0.0314
Jul-22		0.0043	<0.0039	<0.00078	<0.00078	0.0180	<0.00078	0.0153
Jan-23	0.0020	<0.00078	<0.0039	0.0014	0.0072	0.0152	0.0105	0.0111
Jan-24		<0.00078	0.0174	<0.00078	<0.0039	0.0128	0.0192	0.0077
# Data	25	31	31	31	31	31	31	31
# > MDL	7	5	6	6	7	9	8	6
# > PCL	0	0	0	0	0	0	0	0
NAPHTHALENE: $^{GW}GW_{CLASS\ 3}$ = 49 mg/L								
Jul-01		0.035	0.410	<0.1	0.200	0.096	0.057	<0.1
Jan-02	0.066	0.075	0.190	0.066	0.160	0.070	<0.1	<0.02

SUPPLEMENTAL TABLE XI.B.[j]

SITE E HISTORICAL RESULTS

Well >	MW-38	MW-39	MW-40	MW-41	MW-38A	MW-39A	MW-40A	MW-41A
Sat. Zone >	U Sand	U Sand	U Sand	U Sand	L Gravel	L Gravel	L Gravel	L Gravel
Jul-02	<0.1	<0.1	0.150	<0.1	0.110	0.110	<0.1	<0.1
Jan-03		0.038	0.073	0.030	0.071	0.072	0.028	<0.02
Jul-03		<0.04	0.110	0.057	0.130	<0.04	0.054	<0.04
Jan-04		0.056	0.150	0.050	0.100	<0.04	0.054	<0.01
Jul-04	<0.2	<0.1	0.160	0.058	0.048	0.17	<0.1	<0.01
Jan-05	<0.1	<0.1	0.140	<0.1	<0.1	0.18	<0.1	<0.01
Jul-05	<0.1	<0.1	0.150	<0.1	<0.1	<0.1	<0.1	<0.1
Jan-06	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1
Jul-06	<0.1	0.054	0.13	0.12	0.059	0.079	0.064	0.058
Jan-07	<0.1	<0.1	0.2	0.13	<0.1	<0.1	<0.1	<0.1
Jul-07	<0.1	<0.1	0.12	0.11	<0.1	<0.1	0.1	<0.1
Jan-08	0.048	<0.05	0.15	0.12	0.041	0.084	0.1	0.073
Jul-08	<0.05	0.084	0.12	0.085	<0.05	<0.1	0.079	0.056
Jan-09	<0.05	0.22	0.2	0.12	0.065	0.07	<0.05	0.04
Jul-09	<0.04	0.1	0.13	0.072	0.042	0.052	0.077	0.055
Jan-10	<0.054	0.21	0.24	0.12	0.063	0.085	0.15	0.12
Jul-10	<0.054	0.23	0.23	0.76	0.071	0.098	0.12	0.15
Jan-11	<0.02	0.31	0.22	0.026	0.079	0.099	0.19	0.17
Jul-11	<0.023	0.0752	0.167	0.0228	0.0949	0.326	0.137	0.123
Jan-12	0.0121	0.147	0.0953	0.0236	0.0588	0.07	0.117	0.0995
Jul-12	0.0088	0.0793	0.135	DRY	0.222	0.0838	0.151	0.0276
Jan-13	0.0115	0.185	0.0827	0.0242	0.0729	0.0876	0.128	0.0597
Jul-13	0.008	0.109	0.0629	0.041	0.0696	0.252	0.153	0.0571
Jan-14	0.0082	0.16	0.0499	0.0175	0.062	0.0744	0.124	0.0229
Jan-21	0.0115	<0.0011	0.0764	0.0044	0.0295	0.0941	0.0083	0.0758
Jan-22	0.0106	0.404	0.0211	0.0057	0.0296	0.0719	0.108	0.0791
Jul-22		0.4490	0.0107	0.0066	0.0197	0.0846	0.0587	0.0666
Jan-23	0.0104	<0.00027	<0.00027	0.0055	0.0203	0.0883	0.0694	0.0794
Jan-24		0.5300	0.0321	0.0062	0.0216	0.1110	0.0624	0.0896
# Data	25	31	31	31	31	31	31	31
# > MDL	10	20	29	25	25	25	23	19
# > PCL	0	0	0	0	0	0	0	0
PENTACHLOROPHENOL: $^{GW}GW_{CLASS\ 3}$ = 0.10 mg/L								
Jul-01		<0.05	0.072	<0.05	<0.05	<0.05	0.048	<0.05
Jan-02	0.012	0.027	0.076	0.015	0.013	0.031	0.073	0.015
Jul-02	<0.5	<0.05	0.097	<0.05	<0.02	<0.05	0.050	<0.05
Jan-03		<0.05	0.028	<0.05	<0.01	<0.05	0.016	<0.01
Jul-03		0.026	0.097	0.023	<0.02	0.04	0.054	0.021
Jan-04		<0.02	0.042	<0.02	<0.02	0.04	0.025	<0.005
Jul-04	<0.1	<0.05	<0.05	<0.02	<0.01	0.04	<0.05	<0.005
Jan-05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.005
Jul-05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Jan-06	<0.05	<0.05	0.068	<0.05	<0.05	<0.05	0.062	<0.05
Jul-06	<0.05	0.025	0.055	<0.025	<0.025	0.03	0.034	0.042
Jan-07	<0.05	<0.05	0.067	<0.05	<0.05	<0.05	<0.05	<0.05
Jul-07	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.054	<0.05
Jan-08	<0.005	<0.025	0.053	0.005	<0.005	<0.025	<0.005	0.022
Jul-08	<0.005	0.0028	0.07	<0.025	<0.025	0.053	0.034	0.035
Jan-09	<0.025	<0.025	<0.025	<0.025	<0.025	0.029	<0.025	0.019
Jul-09	<0.02	<0.02	0.056	<0.02	<0.02	<0.02	0.028	<0.02
Jan-10	<0.027	0.035	0.076	0.027	<0.026	0.031	0.047	<0.026
Jul-10	<0.27	<0.25	<0.27	<0.025	<0.26	<0.25	<0.25	<0.026
Jan-11	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Jul-11	0.0124	0.0445	0.0665	0.0115	0.037	0.0418	0.0555	0.0583
Jan-12	0.0109	0.0308	0.0443	0.0129	0.0146	0.0329	0.0474	0.043
Jul-12	0.0037	0.0221	0.0335	DRY	0.0238	0.0193	0.0301	0.0054
Jan-13	0.003	0.0123	0.0164	0.0041	0.0044	0.0138	0.0222	0.0272
Jul-13	0.0022	0.0216	0.0194	0.0172	0.0086	0.014	0.0344	0.0315
Jan-14	0.0023	0.007	0.0129	0.0044	0.0042	0.0147	0.0241	0.0266
Jan-21	0.0034	0.0046	0.0229	0.0024	0.0022	0.0035	0.0124	0.0037
Jan-22	0.0025	0.0022	0.0129	<0.024	<0.024	<0.024	0.0148	<0.024
Jul-22		0.0028	0.0186	0.0017	0.0013	0.0018	0.013	0.002

SUPPLEMENTAL TABLE XI.B.[j]

SITE E HISTORICAL RESULTS

Well >	MW-38	MW-39	MW-40	MW-41	MW-38A	MW-39A	MW-40A	MW-41A
Sat. Zone >	U Sand	U Sand	U Sand	U Sand	L Gravel	L Gravel	L Gravel	L Gravel
Jan-23	**0.0161**	<0.0047	**0.0335**	<0.0047	**0.0075**	<0.0047	**0.0211**	<0.0047
Jan-24		**0.0012**	<0.020	**0.0023**	**0.0063**	**0.0011**	<0.010	**0.003**
# Data	**25**	**31**	**31**	**31**	**31**	**31**	**31**	**31**
# > MDL	**10**	**15**	**23**	**12**	**11**	**17**	**22**	**15**
# > PCL	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
PHENOL: $^{GW}GW_{CLASS\ 3}$ = 730 mg/L								
Jul-01		<0.1	**0.038**	<0.1	<0.1	<0.1	**0.160**	<0.1
Jan-02	<0.02	<0.05	<0.05	**0.020**	<0.02	<0.05	**0.010**	<0.02
Jul-02	<0.1	<0.1	<0.1	<0.1	<0.04	<0.1	<0.1	<0.1
Jan-03		<0.1	<0.1	<0.1	<0.02	<0.1	<0.1	<0.02
Jul-03		<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Jan-04		<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.01
Jul-04	<0.2	<0.1	<0.1	<0.04	<0.02	<0.04	<0.1	<0.01
Jan-05	<0.1	<0.1	<0.1	<0.04	<0.1	<0.1	<0.1	<0.01
Jul-05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Jan-06	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Jul-06	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Jan-07	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Jul-07	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Jan-08	<0.01	<0.05	<0.05	<0.01	<0.01	<0.05	<0.01	<0.01
Jul-08	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05
Jan-09	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02
Jul-09	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Jan-10	<0.054	<0.053	<0.052	<0.053	<0.052	<0.056	<0.052	<0.052
Jul-10	<0.054	<0.051	<0.054	<0.051	<0.052	<0.05	<0.05	<0.0051
Jan-11	<0.02	<0.025	<0.02	<0.02	<0.02	<0.02	<0.021	<0.02
Jul-11	<0.016	<0.015	<0.015	<0.003	<0.015	<0.015	<0.015	<0.015
Jan-12	<0.00076	<0.0015	<0.0016	<0.00078	<0.00078	<0.0016	<0.0015	<0.0016
Jul-12	**0.0013**	<0.003	<0.0030	DRY	<0.003	<0.0030	<0.0030	<0.0030
Jan-13	<0.0059	<0.0059	<0.0059	<0.0059	<0.0059	<0.0059	<0.0059	<0.0059
Jul-13	<0.0059	<0.0059	<0.0059	<0.0059	<0.0059	<0.0059	<0.0059	<0.0059
Jan-14	<0.0061	<0.0059	<0.0061	<0.0059	<0.0059	<0.0067	<0.0059	<0.0059
Jan-21	**0.0014**	**0.0016**	**0.0019**	<0.0011	<0.0011	<0.0011	**0.0017**	<0.0011
Jan-22	<0.0048	<0.0049	<0.0096	<0.0048	<0.0049	<0.0049	<0.0095	<0.0048
Jul-22		<0.000027	<0.000027	<0.000027	<0.000028	<0.000028	<0.000027	<0.000027
Jan-23	<0.0004	<0.0004	<0.0004	<0.00040	<0.0004	<0.0004	**0.027**	<0.00040
Jan-24		**0.0015**	<0.0055	<0.00027	**0.0039**	<0.00027	<0.0027	<0.00027
# Data	**25**	**31**	**31**	**31**	**31**	**31**	**31**	**31**
# > MDL	**2**	**2**	**2**	**1**	**1**	**0**	**4**	**0**
# > PCL	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
PYRIDINE: $^{GW}GW_{CLASS\ 3}$ = 2.4 mg/L								
Jul-01		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Jan-02	<0.02	<0.05	<0.05	**0.020**	<0.02	<0.05	**0.010**	<0.02
Jul-02	<0.1	<0.1	<0.1	<0.1	<0.04	<0.1	<0.1	<0.1
Jan-03		<0.1	<0.1	<0.1	<0.02	<0.1	<0.1	<0.02
Jul-03		<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Jan-04		<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.01
Jul-04	<0.2	<0.1	<0.1	<0.04	<0.02	<0.04	<0.1	<0.01
Jan-05	<0.1	<0.1	<0.1	<0.04	<0.1	<0.1	<0.1	<0.01
Jul-05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Jan-06	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Jul-06	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Jan-07	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Jul-07	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Jan-08	<0.01	<0.05	<0.05	<0.01	<0.01	<0.05	<0.01	<0.01
Jul-08	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05
Jan-09	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02
Jul-09	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Jan-10	<0.054	<0.053	<0.052	<0.053	<0.052	<0.056	<0.052	<0.052
Jul-10	<0.054	<0.051	<0.054	<0.051	<0.052	<0.05	<0.05	<0.051
Jan-11	<0.02	<0.025	<0.02	<0.02	<0.02	<0.02	<0.021	<0.02

SUPPLEMENTAL TABLE XI.B.[j]

SITE E HISTORICAL RESULTS

Well >	MW-38	MW-39	MW-40	MW-41	MW-38A	MW-39A	MW-40A	MW-41A
Sat. Zone >	U Sand	U Sand	U Sand	U Sand	L Gravel	L Gravel	L Gravel	L Gravel
Jul-11	<0.02	<0.02	<0.02	<0.004	<0.02	<0.02	<0.02	<0.02
Jan-12	<0.001	<0.0020	<0.0020	<0.001	<0.001	<0.0021	<0.002	<0.0021
Jul-12	<0.0010	<0.004	<0.0040	DRY	<0.004	<0.0040	<0.0040	<0.0040
Jan-13	<0.017	<0.017	<0.017	<0.017	<0.017	<0.017	<0.017	<0.017
Jul-13	<0.017	<0.017	<0.017	<0.017	<0.017	<0.017	<0.017	<0.017
Jan-14	<0.0053	<0.0051	<0.0053	<0.0051	<0.0051	<0.0058	<0.0051	<0.0051
Jan-21	<0.0011	<0.001	<0.001	**0.0017**	<0.0011	<0.0011	**0.0011**	<0.0011
Jan-22	<0.0048	<0.0049	<0.0096	**0.0024**	**0.0026**	<0.0049	<0.0095	**0.0014**
Jul-22		<0.0010	<0.001	<0.001	<0.0011	<0.0011	<0.001	<0.001
Jan-23	<0.0037	<0.0037	<0.0037	<0.0037	<0.0037	<0.0037	<0.0037	<0.0037
Jan-24		<0.011	<0.21	<0.011	<0.011	<0.011	<0.11	<0.011
# Data	25	31	31	31	31	31	31	31
# > MDL	0	0	0	3	1	0	2	1
# > PCL	0	0	0	0	0	0	0	0
ARSENIC: $^{GW}GW_{CLASS\ 3}$ = 1.0 mg/L								
Jul-01		0.0639	0.215	0.097	0.0601	0.0964	0.131	0.0612
Jan-02	0.128	0.091	0.218	0.104	0.101	0.151	0.161	0.0883
Jul-02	0.1	0.08	0.2	0.09	0.07	0.1	0.2	0.08
Jan-03		0.0811	0.173	0.0763	0.0619	0.11	0.152	0.0685
Jul-03		0.0725	0.206	0.0747	0.0716	0.114	0.18	0.0607
Jan-04		0.0834	0.214	0.0752	0.0667	0.107	0.169	0.054
Jul-04	0.276	0.0774	0.193	0.0681	0.063	0.0996	0.16	0.548
Jan-05	0.0889	0.0752	0.174	0.067	0.0656	0.0836	0.151	0.0533
Jul-05	**0.0763**	**0.0721**	**0.198**	**0.0589**	**0.0816**	**0.084**	**0.167**	**0.084**
Jan-06	**0.0802**	**0.0712**	**0.214**	**0.0733**	**0.0905**	**0.0973**	**0.184**	**0.112**
Jul-06	0.0929	<0.1	0.169	0.0649	0.094	0.122	0.109	0.111
Jan-07	0.0754	0.0658	0.138	0.055	0.0686	0.0983	0.104	0.0807
Jul-07	0.0646	0.0454	0.133	0.0489	0.0555	0.0522	0.0920	0.0704
Jan-08	0.0759	0.063	0.145	0.0549	0.0531	0.0595	0.0934	0.0655
Jan-09	0.0737	0.0778	0.156	0.044	0.0478	0.0972	0.0981	0.0773
Jan-13	0.0937	0.0540	0.0708	0.0518	0.0423	0.0859	0.0755	0.1100
Jul-13	0.0905	0.0925	0.0729	0.0700	0.0543	0.0585	0.0990	0.1170
Jan-14	0.0973	0.0502	0.0703	0.0641	0.0469	0.0867	0.0929	0.1310
Jan-21	0.178	0.037	0.103	0.0554	0.0507	0.057	0.0819	0.0344
Jan-22	0.0934	0.0531	0.0826	0.0641	0.0458	0.0715	0.0927	0.0363
Jul-22		0.0472	0.0826	0.0604	0.0479	0.079	0.0926	0.0355
Jan-23	0.0981	0.228	0.0765	0.0554	0.0742	0.0853	0.0991	0.0306
Jan-24		0.154	0.109	0.0674	0.0818	0.101	0.0971	0.0367
# Data	17	23	23	23	23	23	23	23
# > MDL	16	21	22	22	22	22	22	22
# > PCL	0	0	0	0	0	0	0	0
NICKEL: $^{GW}GW_{CLASS\ 3}$ = 49 mg/L								
Jul-01		0.066	0.086	<0.05	0.059	<0.05	<0.05	<0.05
Jan-02	0.052	0.053	0.091	<0.05	0.054	<0.05	<0.05	<0.05
Jul-02	<0.05	0.053	0.064	0.053	0.058	0.056	<0.05	<0.05
Jan-03		<0.05	0.070	<0.05	0.051	<0.05	0.070	<0.05
Jul-03		0.067	0.065	<0.05	<0.05	<0.05	<0.05	0.052
Jan-04		<0.05	0.070	0.053	<0.05	<0.05	<0.05	<0.05
Jul-04	0.053	<0.05	0.066	0.055	0.051	<0.05	<0.05	<0.05
Jan-05	0.0505	<0.05	0.073	<0.05	<0.05	<0.05	<0.05	<0.05
Jul-05	0.052	0.0526	0.073	<0.05	0.0536	<0.05	<0.05	<0.05
Jan-06	<0.05	<0.05	0.0692	<0.05	0.0538	<0.05	<0.05	<0.05
Jul-06	<0.05	<0.05	0.0805	<0.05	0.061	0.054	<0.05	<0.05
Jan-07	0.0551	<0.05	0.0754	<0.05	0.0619	<0.05	<0.05	0.0509
Jul-07	<0.05	0.0552	0.0792	<0.05	0.0608	<0.05	<0.05	<0.05
Jan-08	0.0623	0.0467	0.0874	0.0443	0.0579	0.0286	0.0306	0.0436
Jul-08	0.0494	0.0477	0.0852	0.0317	0.0517	0.04	0.0396	0.0411
Jan-09	0.0682	0.0521	0.0898	0.0335	0.0896	0.0592	0.14	2.44
Jul-09	0.0536	0.0413	0.0663	0.029	0.0374	0.0327	0.0323	0.0361
Jan-10	0.0606	0.057	0.109	0.0355	0.0599	0.044	0.0502	0.0542
Jul-10	0.0428	0.0488	0.0896	0.0267	0.0309	0.0369	0.0309	0.0402

SUPPLEMENTAL TABLE XI.B.[j]

SITE E HISTORICAL RESULTS

Well >	MW-38	MW-39	MW-40	MW-41	MW-38A	MW-39A	MW-40A	MW-41A
Sat. Zone >	U Sand	U Sand	U Sand	U Sand	L Gravel	L Gravel	L Gravel	L Gravel
Jan-11	0.0568	0.0621	0.101	<0.05	0.0793	0.0583	0.0696	0.0631
Jul-11	0.0372	0.0336	0.0828	0.019	0.0488	0.0376	0.0263	0.0304
Jan-12	0.0401	0.0405	0.0752	0.0225	0.0321	0.0343	0.0344	0.0332
Jul-12	0.0433	0.046	0.0896	DRY	0.06	0.0354	0.0419	0.0318
Jan-13	0.0505	0.0468	0.0786	0.0404	0.033	0.037	0.0386	0.0427
Jul-13	0.0453	0.0392	0.0708	0.04	0.0406	0.045	0.0406	0.047
Jan-14	0.0469	0.0464	0.0588	0.0402	0.0351	0.0388	0.0376	0.0472
Jan-21	0.0826	0.0295	0.048	0.04	0.0403	0.0232	0.0463	0.0227
Jan-22	0.0412	0.0191	0.0435	0.0406	0.0338	0.0293	0.0406	0.0298
Jul-22		0.0222	0.0437	0.0414	0.0335	0.0278	0.0127	0.0281
Jan-23	0.0436	0.0128	0.052	0.0524	0.0372	0.0327	0.0547	0.0321
Jan-24		0.0214	0.0717	0.057	0.0482	0.0304	0.0542	0.0295
# Data	25	31	31	31	31	31	31	31
# > MDL	21	24	31	19	28	20	19	20
# > PCL	0	0	0	0	0	0	0	0
SELENIUM: $^{GW}GW_{CLASS\ 3}$ = 5.0 mg/L								
Jul-01		<0.02	<0.02	<0.02	<0.02	0.096	<0.02	<0.02
Jan-02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Jul-02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Jan-03		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Jul-03		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Jan-04		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Jul-04	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Jan-05	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Jul-05	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Jan-06	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Jul-06	<0.02	<0.1	<0.02	<0.02	<0.02	<0.1	<0.02	<0.02
Jan-07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Jul-07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Jan-08	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Jul-08	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Jan-09	<0.02	<0.02	<0.02	<0.02	<0.02	0.0243	<1	<0.5
Jul-09	<0.02	<0.02	0.0867	<0.02	<0.02	<0.02	<0.02	<0.02
Jan-10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Jul-10	<0.01	<0.005	<0.01	<0.01	<0.01	<0.005	0.0116	<0.01
Jan-11	<0.2	<0.2	<0.2	<0.2	<0.4	<0.2	<0.4	<0.2
Jul-11	0.00089	0.00093	0.00089	0.0011	0.00093	0.00077	0.00087	0.00087
Jan-12	<0.001	<0.00083	<.001	<0.0010	<0.00083	<0.00083	<0.00083	<0.00083
Jul-12	0.0022	0.0031	<0.0027	DRY	0.0032	0.0037	0.0054	<0.0014
Jan-13	<0.0014	<0.0014	<0.0014	<0.0014	<0.0027	0.0016	0.0032	<0.0014
Jul-13	0.002	0.0028	<0.0014	0.0022	0.0025	0.0017	0.009	0.0017
Jan-14	0.0046	0.0037	0.003	0.0037	0.0043	0.0049	0.0105	0.004
Jan-21	0.0028	0.00081	0.0014	0.0014	<0.00097	0.0014	0.0011	0.0016
Jan-22	<0.005	<0.005	<0.005	<0.005	<0.005	<0.050	<0.005	<0.050
Jul-22		<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.025
Jan-23	<0.014	<0.014	<0.014	<0.014	0.014	<0.056	<0.014	<0.056
Jan-24		<0.014	<0.014	<0.014	<0.014	<0.014	<0.014	<0.028
# Data	25	31	31	31	31	31	31	31
# > MDL	5	5	4	4	5	8	7	4
# > PCL	0	0	0	0	0	0	0	0
VANADIUM: $^{GW}GW_{CLASS\ 3}$ = 4.4 mg/L								
Jul-01		<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
Jan-02	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
Jul-02	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
Jan-03		<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
Jul-03		<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
Jan-04		<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
Jul-04	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
Jan-05	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
Jul-05	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
Jan-06	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08

SUPPLEMENTAL TABLE XI.B.[j]

SITE E HISTORICAL RESULTS

Well >	MW-38	MW-39	MW-40	MW-41	MW-38A	MW-39A	MW-40A	MW-41A
Sat. Zone >	U Sand	U Sand	U Sand	U Sand	L Gravel	L Gravel	L Gravel	L Gravel
Jul-06	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
Jan-07	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
Jul-07	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
Jan-08	<0.005	**0.00853**	**0.00712**	<0.005	**0.0094**	**0.00837**	**0.00663**	**0.0127**
Jul-08	<0.005	<0.005	<0.005	<0.005	<0.005	**0.00676**	<0.005	**0.00607**
Jan-09	**0.0175**	**0.019**	**0.0284**	**0.0318**	**0.0238**	**0.0312**	<0.025	<0.025
Jul-09	<0.005	<0.005	**0.00626**	<0.005	<0.005	**0.00657**	<0.005	**0.00627**
Jan-10	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
Jul-10	<0.005	<0.005	<0.005	<0.005	<0.005	**0.0057**	<0.005	**0.0073**
Jan-11	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Jul-11	**0.0018**	**0.0097**	**0.0032**	**0.0022**	**0.0064**	**0.0058**	**0.0047**	**0.0064**
Jan-12	<0.002	**0.0062**	**0.0032**	**0.0022**	<0.01	<0.01	<0.01	<0.010
Jul-12	**0.0011**	**0.0056**	**0.0031**	DRY	**0.0069**	**0.0093**	**0.0051**	**0.0016**
Jan-13	**0.0023**	**0.0059**	**0.0039**	**0.0022**	**0.0056**	**0.0099**	**0.006**	**0.0067**
Jul-13	**0.0028**	**0.0095**	**0.0041**	**0.0037**	**0.0075**	**0.0059**	**0.0066**	**0.0072**
Jan-14	**0.0024**	**0.0054**	**0.0037**	**0.003**	**0.006**	**0.0088**	**0.0059**	**0.0077**
Jan-21	**0.0028**	**0.0212**	**0.0037**	**0.0024**	**0.0024**	**0.0019**	**0.0016**	**0.0025**
Jan-22	**0.0015**	**0.0224**	**0.0016**	**0.0028**	**0.0018**	<0.010	**0.0033**	<0.010
Jul-22		**0.0194**	**0.0016**	**0.0028**	**0.002**	<0.005	**0.0031**	<0.005
Jan-23	<0.0018	**0.0168**	<0.0018	**0.0022**	**0.0046**	<0.0072	**0.0037**	<0.0072
Jan-24		**0.0209**	**0.0021**	**0.003**	**0.0069**	**0.0025**	**0.0036**	<0.0036
# Data	25	31	31	31	31	31	31	31
# > MDL	8	13	13	11	12	12	11	10
# > PCL	0	0	0	0	0	0	0	0

<5.00	**Less Than Method Detction Limit**
5.00	**Greater than Method Detection Limit but Less Than PCL**
5.00	**Greater than the PCL**
BLANK	**No Analysis for this event identified**
	LNAPL Present at time of Sampling

Supplemental Table XI.B.1.a.

Groundwater Protection Standards by Unit & Monitored Zone

Constituent	Program	Screened Zone	PCL	ANALYTICAL INFORMATION			RESULTS			
			$^{GW}GW_{Class3}$		MQL	SDL	# Data	# Results	# Results	Location & Date
			mg/l	Method	mg/l	mg/l	Found	>MDL	>PCL	of Last > PCL
Benzene	BICA	U Sand	0.5	8260	0.001	0.00023	1,513	428	72	IW-58, Jan-19
	BICA	L Gravel	0.5	8260	0.001	0.00023	1,533	664	100	MW-152A, MW-163A Jan-24
	BICA	Both Sand & Gravel	0.5	8260	0.001	0.00023	455	200	24	RW-194, Jul-06
1,2-Dichloroethane	BICA	U Sand	0.5	8260	0.001	0.00041	NA	NA	NA	NA
	BICA	L Gravel	0.5	8260	0.001	0.00041	NA	NA	NA	NA
	BICA	Both Sand & Gravel	0.5	8260	0.001	0.00041	457	366	1	RW-145, Apr-98
Arsenic	BICA	U Sand	1	6020A	0.005	0.0028	NA	NA	NA	NA
	BICA	L Gravel	1	6020A	0.005	0.0028	NA	NA	NA	NA
	BICA	Both Sand & Gravel	1	6020A	0.005	0.0028	414	269	4	RW-145, Apr-98
Chromium	BICA	U Sand	10	6020A	0.005	0.0036	10	0	0	NA
	BICA	L Gravel	10	6020A	0.005	0.0036	35	1	0	NA
Lead	BICA	U Sand	1.5	6020A	0.005	0.0036	34	1	0	NA
	BICA	L Gravel	1.5	6020A	0.005	0.0036	10	1	0	NA
Magnesium	BICA	U Sand	NA	6020A	0.005	0.0036	32	32	NA	NA
	BICA	L Gravel	NA	6020A	0.005	0.0036	7	7	NA	NA
Toluene	BICA	U Sand	100	8260	0.001	0.00023	35	8	0	NA
	BICA	L Gravel	100	8260	0.001	0.00023	10	3	0	NA
Xylenes, total	BICA	U Sand	1000	8260	0.002	0.00039	35	6	0	NA
	BICA	L Gravel	1000	8260	0.002	0.00039	10	2	0	NA
Phenol	BICA	U Sand	730	8270D	0.049	0.00027	35	2	0	NA
	BICA	L Gravel	730	8270D	0.049	0.00027	9	2	0	NA
Acetone	SITE E	U Sand	2200	8260	0.05	0.0011	118	30	0	NA
	SITE E	L Gravel	2200	8260	0.05	0.0011	124	37	0	NA
Benzene	SITE E	U Sand	0.5	8260	0.001	0.00023	316	311	69	MW-40, Jan-09
	SITE E	L Gravel	0.5	8260	0.001	0.00023	324	311	29	MW-40A, Jul-00
Carbon disulfide	SITE E	U Sand	240	8260	0.001	0.00027	118	13	0	NA
	SITE E	L Gravel	240	8260	0.001	0.00027	124	41	0	NA
Ethylbenzene	SITE E	U Sand	70	8260	0.001	0.00023	193	192	0	NA
	SITE E	L Gravel	70	8260	0.001	0.00023	199	197	0	NA
Methyl ethyl Ketone	SITE E	U Sand	1500	8260	0.013	0.00078	118	24	0	NA
	SITE E	L Gravel	1500	8260	0.013	0.00078	124	30	0	NA
Toluene	SITE E	U Sand	100	8260	0.001	0.00023	193	191	0	NA
	SITE E	L Gravel	100	8260	0.001	0.00023	199	194	0	NA

Supplemental Table XI.B.1.a.

Groundwater Protection Standards by Unit & Monitored Zone

Constituent	Program	Screened Zone	PCL	ANALYTICAL INFORMATION			RESULTS			
			$^{GW}GW_{Class3}$		MQL	SDL	# Data	# Results	# Results	Location & Date
			mg/l	Method	mg/l	mg/l	Found	>MDL	>PCL	of Last > PCL
Xylenes, total	SITE E	U Sand	1000	8260	0.002	0.00039	192	191	0	NA
	SITE E	L Gravel	1000	8260	0.002	0.00039	197	196	0	NA
Benzenethiol	SITE E	U Sand	0.24	8270D	0.049	0.0012	158	99	11	MW-39, Jul-23
	SITE E	L Gravel	0.24	8270D	0.049	0.0012	163	98	10	MW-40A, Jul-17
2,4-Dimethylphenol	SITE E	U Sand	49	8270D	0.049	0.0006	118	116	0	NA
	SITE E	L Gravel	49	8270D	0.049	0.0006	124	124	0	NA
Cresols, totals	SITE E	U Sand	120	8270D	0.049	0.00028	118	114	0	NA
	SITE E	L Gravel	120	8270D	0.049	0.00028	124	112	0	NA
Pentachlorophenol	SITE E	U Sand	0.1	8270D	0.097	0.001	118	60	0	NA
	SITE E	L Gravel	0.1	8270D	0.097	0.001	124	65	0	NA
Phenol	SITE E	U Sand	730	8270D	0.049	0.00027	118	7	0	NA
	SITE E	L Gravel	730	8270D	0.049	0.00027	124	5	0	NA
1-Methyl naphthalene	SITE E	U Sand	3.1	8270D	0.0019	0.00069	118	68	0	NA
	SITE E	L Gravel	3.1	8270D	0.0019	0.00069	124	76	0	NA
2-Methyl naphthalene	SITE E	U Sand	9.8	8270D	0.0019	0.00061	118	33	0	NA
	SITE E	L Gravel	9.8	8270D	0.0019	0.00061	124	30	1	MW-38A, Jul-01
Napthalene	SITE E	U Sand	49	8270D	0.0019	0.00075	118	84	0	NA
	SITE E	L Gravel	49	8270D	0.0019	0.00075	124	92	0	NA
Pyridine	SITE E	U Sand	2.4	8270D	0.049	0.011	118	3	0	NA
	SITE E	L Gravel	2.4	8270D	0.049	0.011	124	4	0	NA
Arsenic	SITE E	U Sand	1	6020A	0.005	0.0028	86	81	0	NA
	SITE E	L Gravel	1	6020A	0.005	0.0028	92	88	0	NA
Nickel	SITE E	U Sand	49	6020A	0.005	0.0026	118	95	0	NA
	SITE E	L Gravel	49	6020A	0.005	0.0026	124	87	0	NA
Selenium	SITE E	U Sand	5	6020A	0.025	0.014	118	18	0	NA
	SITE E	L Gravel	5	6020A	0.025	0.014	124	24	0	NA
Vanadium	SITE E	U Sand	4.4	6020A	0.005	0.0018	118	45	0	NA
	SITE E	L Gravel	4.4	6020A	0.005	0.0018	124	45	0	NA

Supplemental Table XI.B. - SECTION IX – COMPLAINCE PLAN SUPPLEMENTAL INFORMATION:

SECTION	DESCRIPTION	RESPONSE
B.	Hazardous Constituents in Groundwater and Groundwater Protection Standards (GWPS)	
B.	Hazardous Constituents in Groundwater	See Supplemental Table XI.B.[a-j] - Historical Groundwater Results
		See Supplemental Table XI.B.1.a - Constituents and PCLs
		See Attachment XI.B.2. - Class 3 GW Designation Letter from TCEQ
		See Figure XI.A.4.g (9 sheets)_Plume Concentration
	Corrective Action Program	See CP Table III - Corrective Action Program
	Compliance Monitoring Program	See CP Table IV - Compliance Monitoring Program
B.1.	GWPS	See Supplemental Table XI.B.[a-j] - Historical Groundwater Results
B.2.	Establishing the GWPS	The GWPS utilized is the TRRP $^{GW}GW_{Class3}$ PCLs - See Attachment XI.B.2. - September 28, 2006 TCEQ Correspondance establishing that the area groundwater is Class 3.

50-03073.84

Kathleen Hartnett White, *Chairman*
Larry R. Soward, *Commissioner*
Glenn Shankle, *Executive Director*

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

September 28, 2006

Mr. Joseph A. Concienne, III
Vice President, Refining and Transportation
ALON USA
P. O. Box 1311
Big Spring, TX 79721

Re: ALON USA
Big Spring Refinery - Big Spring, Texas
TCEQ Solid Waste Registration Number 30083
EPA ID No. TXDOO8013468
Compliance Plan No. CP-50140
Area Groundwater Classification

Dear Mr. Concienne:

The Texas Commission on Environmental Quality has reviewed the pertinent sections of the previously approved reports *RFI Phase I, Subphases 1 and 2 Corrective Measures Study, Big Spring Refinery, Big Spring, Texas*, submitted to the TCEQ on February 29, 2000 and approved on March 22, 2000, *RFI Phase I, Subphases 3 and 4 Corrective Measures Study, Big Spring Refinery, Big Spring, Texas*, submitted to the TCEQ on March 30, 2000 and approved on May 24, 2000, and *RFI Phase I, Subphases 5 and 6 Corrective Measures Study, Big Spring Refinery, Big Spring, Texas*, submitted to the TCEQ on May 8, 2000 and approved on May 26, 2000.

The reports demonstrate that the groundwater at the facility and its vicinity flows down gradient to the terminus of the aquifer where the naturally occurring total dissolved solids (TDS) concentration exceeds 10,000 mg/L. The water production from the on-site aquifer varies seasonally so as not to provide a reliable source drinking water as discussed in the Texas Risk Reduction Program guidance document RG-366/TRRP-8, entitled *Groundwater Classification*, §2.8.1. As a result, the groundwater within the Big Spring Refinery facility and it's vicinity is Class 3 groundwater in accordance with Texas Administrative Code §350.52(3).

Questions concerning this letter should be directed to me at (512) 239-2361. Please use Mail Code 127 (MC-127) when responding by mail.

Sincerely,

Gary Beyer, P.G., Project Manager
Team I, Environmental Cleanup Section II
Remediation Division
Texas Commission on Environmental Quality

Cc: Waste Program Manager, TCEQ Region 7 Office Midland
Mr. Robert Sherrill, RMT, 805 Las Cimas Parkway, Suite 300, Austin, TX 78746-6179

Alon Big Spring Refinery
(Owned by Delek US)

Compliance Plan CP-50140
Attachment XI.C.
Compliance Monitoring Plan
SWR No. 30083 / RN100250869 / CN600125124

Alon Big Spring Refinery - Big Spring, Texas

October 14, 2024

COMPLIANCE MONITORING PROGRAM

XI.C.1.a.(1) Changes from Current Compliance Monitoring System

(a) Hydrogeologic Information

The Site E monitoring system consists of four (4) paired well clusters screening the Upper Saturated Sands (wells MWs-38, 39, 40, and 41) and the lower Basal Gravels (wells MWs-38A, 39A, 40A, and 41A). This monitoring system is the same used under the current permit and has not changed. Additionally the hydrogeologic information has not changed since the issuance of the current permit. A complete description of the hydrogeologic setting can be found in permit Attachment VI, *Geology Report* of the application. A summary table of the lithologic setting can be found in the attached Table IX.C.(1)(a)-[1], *Well Material & Lithologic Setting – Site E*.

The hydrologic setting has been summarized and graphed in the attached Table IX.C.(1)(a)-[2], *Fluid Level Measurements Under Current Permit – Site E*. During the current permit monitoring (March 2015 – July 2024) groundwater static levels were stable with a variation range of 1.52-feet to 1.92-feet in the upper saturated sands and 1.52-feet to 1.95-feet in the basal gravels.

No changes from the current permit.

(b) Waste Management Unit

The SWMU concerned in this Groundwater Monitoring Program Description is the Site E Land Treatment Unit. Details concerning the unit can be located in application Section XI.B., *Preliminary Review Unit Checklist*. Section XI.B. also has details concerning all current and past units at the facility.

No changes from the current permit.

(c) Construction Details for Monitor Wells

A summary table of the construction and lithologic setting of the eight monitor wells utilized at Site E is attached as Table IX.C.(1)(a)-[1], *Well Material & Lithologic Setting – Site E*. Well construction/lithologic logs are located in application Attachment CP-B [B].

No changes from the current permit.

(d) Number and Location of Additional Monitor Wells

No additional monitoring wells are utilized at Site E. However, the attached Table XI.C.1.a.(1)(d), *All Monitor Wells Currently Utilized* indicates the number and locations of all monitor wells currently utilized.

No changes from the current permit.

(e) Sample Handling, Chain of Custody and Analytical Procedures

Application Attachment XI.D.3.c(1), *Sampling and Analysis Plan* discusses all aspects of sampling, sample handling, documentation and the analysis/analytical procedures.

No changes from the current permit.

(f) Frequency of Monitoring

Each calendar year, the constituents listed in attached Table XI.C.1.A.(1)(f), *Site E Monitoring Parameters* and in application table CP Table IVA, *Compliance Monitoring Program Table of Detected Hazardous Constituents and Groundwater Protection Standard* will be sampled and analyzed annually during January-February. Additionally, the constituents listed in attached Table XI.C.1.A.(1)(d) and in application table CP Table IV (and below), *Compliance Monitoring Program Table of Hazardous and Solid Waste Constituents and Quantification Limits* will be sampled and analyzed semiannually during January-February and July-August.

No changes from the current permit.

(g) Monitoring Parameters

The Site E Constituents to be monitored are indicated in attached Table XI.C.1.A.(1)(d) and on application Tables CP-IV and CP-IVA.

No changes from the current permit.

(h) Evaluation of Compliance

The attached Table XI.C.1.a.(1)(h), *Historical Analytical Results – Site E*, is a summary table of all existing Site E Groundwater analysis (this corresponds to the list on CP Table IV). An evaluation of the data indicates that Benzene and Benzenethiol routinely exceed the Class 3 groundwater protection standard ($^{GW}GW_{class3}$). The results of the evaluation are as follows:

Constituent	GWPS mg/L	Wells Exceeded	# Data/# >GWPS/ # >MDL	Date Last Exceed.
Benzene	0.5	MW-38	56 / 4 / 55	April 1990
		MW-39	88 / 19 / 87	January 1998
		MW-39A	88 / 14 / 84	July 1995
		MW-40	88 / 17 / 86	January 2009
		MW-40A	88 / 13 / 85	July 2000
		MW-41	87 / 29 / 86	January 1998
		MW-41A	88 / 2 / 83	January 1998
Benzenethiol	0.24	MW-38A	39 / 1 / 22	January 2016
		MW-39	44 / 4 / 26	July 2023
		MW-40	43 / 3 / 28	January 1998
		MW-40A	43 / 5 / 27	January 2017
		MW-41	43 / 4 / 27	January 2021
		MW-41A	42 / 4 / 26	January 2016
2-Methyl naphthalene	9.8	MW-40	31 / 1 / 7	July 2001

Since 2-methyl naphthalene has exceed the GWPS only once (23 years ago), it was eliminated from the list of detected hazardous constituents.

No changes from the current permit.

Other Sampling and Analysis Plan Information

None. No changes from the current permit.

(j) Compliance Period

Year Waste Management Activities Initiated 1976
Year Closed 1995
Compliance Period ..... 19 years
See application table CP-VI, *Compliance Period for RCRA-Regulated Units*

(k) Financial Assurance

See application Table XI,E.2.e., *Groundwater Monitoring Cost Estimate*

(l) ACL Variance

Alternate Concentration Limit not requested.

1.a.(2) Number, Depth, and location of all Monitor Wells
See attached Table XI.C.1.a.(1)(d). Also see application CP Table V, *Designation of Wells*.

1.a.(3) Proposed Hazardous Constituent Monitoring List
See attached Table XI.C.1.a.(1)(f), *Site E Monitoring Parameters*. Also see application Table CP Table IV.

1.a.(4) Proposed Indicator Parameter Monitoring List
See attached Table XI.C.1.a.(1)(f), *Site E Monitoring Parameters*. Also see application table Table CP Table IVA.

1.a.(5) Frequency of Monitoring
See application table CP Table VIII, *Compliance Schedule*

1.a.(6) Reporting Provisions
See application table CP Table VII, *Reporting Requirements*

1.a.(7) Annual Determination of Contamination Plume Rate and Direction of Migration
The size, mass load, and the rate and direction of movement will be determined following completion of each sampling event and field measurements.

1.a.(8) Calculate Compliance Period

SITE E	Year or Number of Years
Year Waste Management Activities Initiated	1976
Year Closed	1995
Compliance Period (years)	1995 – 1976 = 19 years
Compliance Period Began	1995

See CP Table VI

1.b. Submit the following plans and reports:

1.b.(1) Current Sampling and Analysis Plan
See application Attachment XI.D.3.c(1), *Sample and Analysis Plan*

1.b.(2) Monitoring System Plan
See application Attachment XI.D.3.c(2)b, *Monitoring System Plan*

1.b.(3) Current Geologic and Hydrogeologic Report
See application Attachment VI, *Geology Report*

XI.C.2.a. Waste Management Unit Monitored

XI.C.2.a.(1) Unit Boundary, Background and Point of Compliance Monitoring Wells
See attached Figure XI.C.2.a.(1), *Site E LTU Boundary & Monitoring Wells*

XI.C.2.a.(2) POC and POE Monitoring WellsSee attached Figure XI.C.2.a.(1), *Site E LTU Boundary & Monitoring Wells*.

XI.C.2.a.(3) Any Other Proposed Monitoring Wells
No other monitoring wells are proposed.

XI.C.2.a.(4) Features Which May Serve as Conduits for Subsurface Contamination
The only potential pathways for contaminate migration identified at Site E is via the naturally occurring hydrogeologic setting.

The uppermost transmissive zone is in the upper Ogallala Formation saturated sands identified at depths ranging from 80-feet below grade (at MWs-39, 39A) to 96-feet below grade (at MWs-38,38A). The uppermost saturated zone extends to the top of the Ogallala Formation Basal Gravels and has a thickness ranging from 39-feet (at MW-41) to 49-feet (MW-39) with an average thickness of 43.9-feet across Site E.

The lower transmissive zone is the basal Ogallala formation gravels identified at depths ranging from 99-feet below grade (at MWs-39, 39A) to 110-feet below grade (at MWs-38, 38A) and extends to the top of the Dockum Formation massive Red Bed Clays ~800-feet thick which has been identified at a depth ranging from 127.5-feet below grade (MW-40A) to 144-feet below grade (MW-38A). The thickness of the lower, basal gravel saturated zone ranges from 23.5-feet (MW-41A) to 34-feet (at MW-38A) with an average thickness of 26.8-feet across Site E.

The groundwater flow direction is generally to the South-Southeast an average rate of 0.92-feet/day in the upper sands and 2.70-feet/day in the basal gravels (based on last 72 groundwater measurements.

For more detailed information See Attachment VI, *Geology Report*.

XI.C.2.b. Waste Management Unit Monitoring System

See application CP Attachment A, Sheet 13 of 13, *Site E Waste Unit*

XI.C.3. Implementation Schedule

See attached Table XI.C.3, *General Compliance Monitoring Implementation Schedule*.
See revised permit table CP Table VIII, *Compliance Schedule*

TABLES

Table IX.C.(1)(a)-[1], *Well Material & Lithologic Setting – Site E*
Table IX.C.(1)(a)-[2], Fluid Level Measurements Under Current Permit – Site E
Table XI.C.1.a.(1)(d), All Monitor Wells Currently Utilized
Table XI.C.1.a.(1)(f), Site E Monitoring Parameters
Table XI.C.1.a.(1)(h), Historical Analytical Results – Site E
Table XI.C.3, General Compliance Monitoring Implementation Schedule

TABLE IX.C.(1)(a)-[1]

WELL MATERIAL & LITHOLOGIC SETTINGS - SITE E

Program	Well ID Number	n/a	MW-38	MW-38A	MW-39	MW-39A	MW-40	MW-40A	MW-41	MW-41A
	Program	n/a	SITE E	SITE E	SITE E	SITE E	SITE E	SITE E	SITE E	SITE E
	Type of Program Well	n/a	BKGRD	BKGRD	POC	POC	POC	POC	POC	POC
	Date Installed	n/a	Sep-87	Sep-87	Sep-87	Sep-87	Sep-87	Sep-87	Sep-87	Sep-87
Survey	Top of Casing	(MSL)	2500.28	2500.25	2485.47	2485.63	2480.01	2479.42	2489.34	2489.88
	Top of Pad	(MSL)	2497.45	2497.58	2482.59	2482.88	2477.28	2477.32	2486.59	2487.05
	Top of Grade	(MSL)	2497.28	2497.41	2482.59	2482.88	2477.03	2477.07	2486.26	2486.80
	TSPC Grid System	NORTHING	243,667	243,661	243,128	243,113	242,865	242,862	243,095	243,108
		EASTING	791,185	791,170	790,962	790,967	791,227	791,217	791,359	791,358
Well Construction	Height of Riser Pipe	(feet)	3.0	2.8	2.9	2.8	3.0	2.3	3.1	3.1
	Total Depth Drilled	(feet)	120.0	160.0	109.0	140.0	107.0	130.0	113.0	135.0
		(MSL)	2377.3	2337.4	2373.6	2342.9	2370.0	2347.1	2373.3	2351.8
	Casing Size	(in.)	2	2	2	2	2	2	2	2
	Casing Material	n/a	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC
	Screen Size	(in.)	2	2	2	2	2	2	2	2
	Screen Material	n/a	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC
	Top Screen	(BGL)	95.0	110.0	79.0	99.0	87.0	108.0	90.0	106.8
		(MSL)	2402.3	2387.4	2403.6	2383.9	2390.0	2369.1	2396.3	2380.0
	Bottom Screen	(BGL)	115.0	146.0	99.0	130.0	107.0	128.0	113.0	130.8
		(MSL)	2382.3	2351.4	2383.6	2352.9	2370.0	2349.1	2373.3	2356.0
	Low-Flow Sampling Pump Intake	(BGL)	105.0	115.0	89.0	120.0	102.0	115.0	101.5	120.0
		(MSL)	2392.3	2382.4	2393.6	2362.9	2375.0	2362.1	2384.8	2366.8
	Top Filter Pack	(BGL)	93.0	108.0	77.0	97.0	85.0	106.0	88.0	104.0
		(MSL)	2404.3	2389.4	2405.6	2385.9	2392.0	2371.1	2398.3	2382.8
	Top Bentonite Seal	(BGL)	88.0	101.0	72.0	91.0	80.0	103.0	82.0	100.0
		(MSL)	2409.3	2396.4	2410.6	2391.9	2397.0	2374.1	2404.3	2386.8
	Locking Steel Cover?	n/a	YES	YES	YES	YES	YES	YES	YES	YES
	Top Casing to Well Bottom	(feet)	118.00	148.84	101.88	132.75	109.98	130.35	116.08	133.88
Lithologic Setting	Top EOLIAN Formation (wind-blow sand/silt)	(FT)	*NE*	*NE*	*NE*	*NE*	*NE*	*NE*	*NE*	*NE*
		(MSL)	*NE*	*NE*	*NE*	*NE*	*NE*	*NE*	*NE*	*NE*
		Thickness (FT)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Top OGALLALA Formation (Sand)	(FT)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		(MSL)	2497.4	2497.4	2482.9	2482.9	2477.1	2477.1	2486.8	2486.8
		Thickness (FT)	110.0	110.0	129.0	129.0	108.0	108.0	106.5	106.5
	Top OGALLALA Formation (Basal Gravel)	(FT)	110.0	110.0	99.0	99.0	108.0	108.0	106.5	106.5
		(MSL)	2387.4	2387.4	2383.9	2383.9	2369.1	2369.1	2380.3	2380.3
		Thickness (FT)	34.0	34.0	30.0	30.0	19.5	19.5	23.5	23.5

TABLE IX.C.(1)(a)-[1]

WELL MATERIAL & LITHOLOGIC SETTINGS - SITE E

Program	Well ID Number	n/a	MW-38	MW-38A	MW-39	MW-39A	MW-40	MW-40A	MW-41	MW-41A
	Program	n/a	SITE E	SITE E	SITE E	SITE E	SITE E	SITE E	SITE E	SITE E
	Type of Program Well	n/a	BKGRD	BKGRD	POC	POC	POC	POC	POC	POC
	Date Installed	n/a	Sep-87	Sep-87	Sep-87	Sep-87	Sep-87	Sep-87	Sep-87	Sep-87
Lithologic Setting	Top Isolated Sandstone Layers - LAYER I	(TOP-FT)	NE	NE	44.0	44.0	NE	NE	NE	NE
		(BOT-FT)	NE	NE	48.0	48.0	NE	NE	NE	NE
		Thickness (FT)	NE	NE	4.0	4.0	NE	NE	NE	NE
	Top Isolated Sandstone Layers - LAYER II	(TOP-FT)	NE	NE	56.0	56.0	NE	NE	NE	NE
		(BOT-FT)	NE	NE	59.0	59.0	NE	NE	NE	NE
		Thickness (FT)	NE	NE	3.0	3.0	NE	NE	NE	NE
	Top DOCKUM (Red-Bed Clay)	(FT)	144.0	144.0	129.0	129.0	127.5	127.5	130.0	130.0
		(MSL)	2353.4	2353.4	2353.9	2353.9	2349.6	2349.6	2356.8	2356.8
Aquifer Conditions	Fluid Level in Borehole (assumed top saturation)	(FT)	96.0	96.0	80.0	80.0	88.0	88.0	91.0	91.0
		(MSL)	2401.4	2401.4	2402.9	2402.9	2389.1	2389.1	2395.8	2395.8
		Thickness (FT)	48.0	48.0	49.0	49.0	39.5	39.5	39.0	39.0
	# of Fluid Level Readings	n/a	64	64	74	74	75	75	73	72
	Historical Maximum Water Level	(BTOC)	106.20	106.25	92.79	92.66	88.19	88.60	96.70	97.34
		(MSL)	2394.1	2394.0	2392.7	2393.0	2391.8	2390.8	2392.6	2392.5
	Historical Minimum Water Level	(BTOC)	99.26	99.28	87.32	87.45	83.31	83.57	71.57	91.76
		(MSL)	2401.0	2401.0	2398.2	2398.2	2396.7	2395.9	2417.8	2398.1
	July 2024 Fluid Level	(BTOC)	105.30	104.85	90.82	91.11	86.52	86.42	95.51	96.10
		(MSL)	2395.0	2395.4	2394.7	2394.5	2393.5	2393.0	2393.8	2393.8
	Vertical Gradient (Between Upper Sand and Lower Gravel)	lin dist. (FT)	15.8		15.9		10.3		13.1	
		verticle (FT)	0.42		-0.13		-0.49		-0.05	
		gradient (FT/ft)	0.0266		-0.0082		-0.0476		-0.0038	
		Direction	Up		Down		Down		Down	

BGL - Below Grade Level (in feet)
BKGRD - Background Monitoring Well
BOT-FT - depth to bottom of Unit in feet
FT - feet
gradient (FT) - groundwater flow in feet per foot
in. - inches
lin dist. (FT) - linear distance in feet
MSL - Mean Sea Level (in feet)
n/a - Not Applicable
NE - Not encountered in well
POC - Point of Compliance Monitoring Well
Thickness (FT) - Thickness of Unit in feet
TOP-FT - depth to top of Unit in feet
verticle (FT) - verticle distance in feet

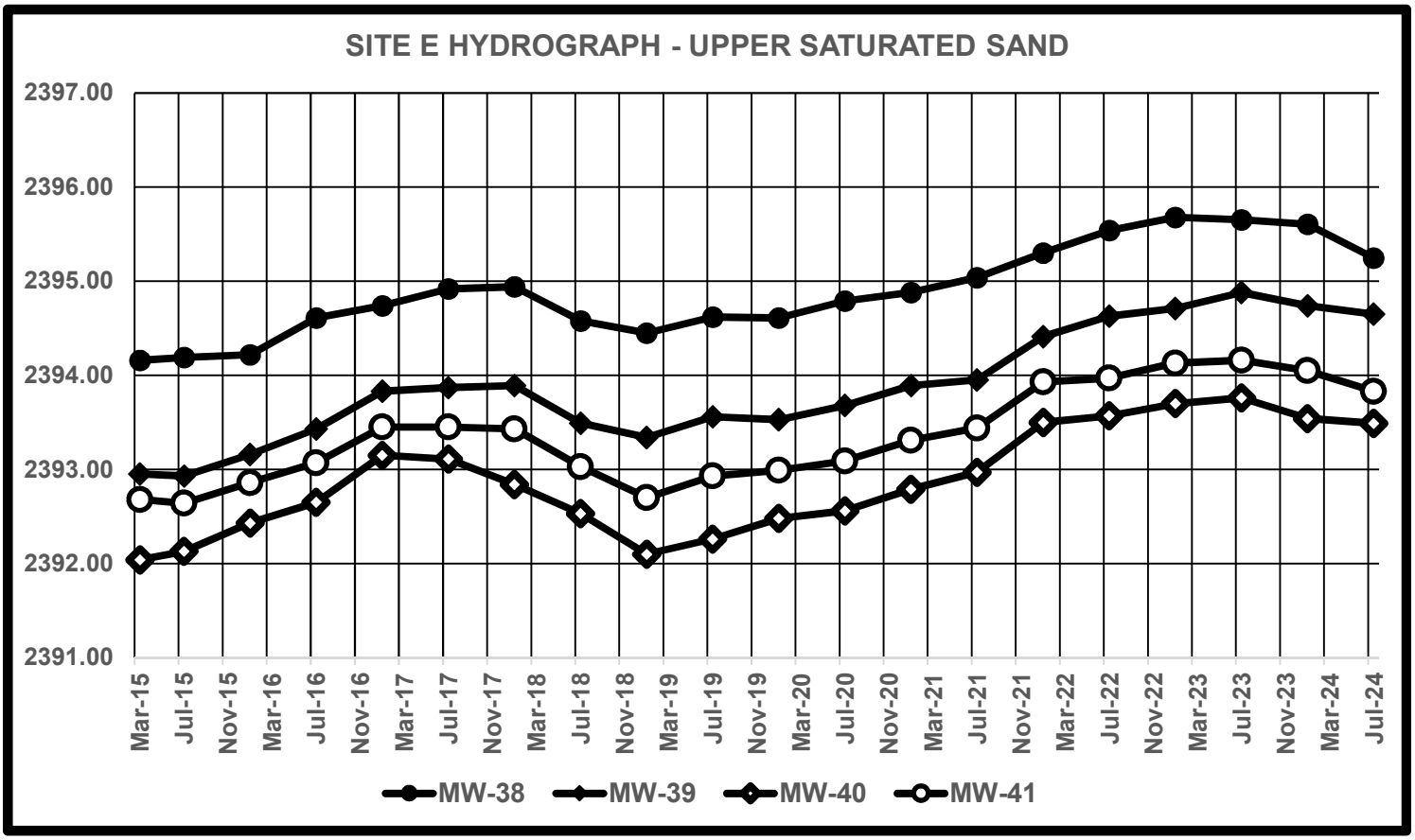
TABLE XI.C.A.(1)(a)-[2]
FLUID LEVEL MEASUREMENTS UNDER CURRENT PERMIT - SITE E

	MW-38		MW-38A		MW-39		MW-39A	
	Northing	Easting	Northing	Easting	Northing	Easting	Northing	Easting
	243,667	791,185	243,661	791,170	243,128	790,962	243,113	790,967
	TOC =	2500.28	TOC =	2500.25	TOC =	2485.47	TOC =	2485.63
	WATER LEVEL		WATER LEVEL		WATER LEVEL		WATER LEVEL	
DATE	ft-Btoc	FT-msl	ft-Btoc	FT-msl	ft-Btoc	FT-msl	ft-Btoc	FT-msl
Mar-15	106.12	2394.16	106.04	2394.21	92.52	2392.95	92.66	2392.97
Jul-15	106.09	2394.19	106.03	2394.22	92.54	2392.93	92.66	2392.97
Jan-16	106.06	2394.22	105.99	2394.26	92.31	2393.16	92.42	2393.21
Jul-16	105.67	2394.61	105.65	2394.60	92.04	2393.43	92.17	2393.46
Jan-17	105.54	2394.74	105.51	2394.74	91.64	2393.83	91.73	2393.90
Jul-17	105.32	2394.92	105.25	2395.00	91.60	2393.87	91.74	2393.89
Jan-18	105.30	2394.94	105.24	2395.01	91.58	2393.89	91.71	2393.92
Jul-18	105.66	2394.58	105.62	2394.63	91.98	2393.49	92.12	2393.51
Jan-19	105.79	2394.45	105.71	2394.54	92.13	2393.34	92.26	2393.37
Jul-19	105.62	2394.62	105.54	2394.71	91.91	2393.56	92.05	2393.58
Jan-20	105.63	2394.61	105.55	2394.70	91.94	2393.53	92.08	2393.55
Jul-20	105.45	2394.79	105.38	2394.87	91.79	2393.68	91.92	2393.71
Jan-21	105.36	2394.88	105.28	2394.97	91.58	2393.89	91.76	2393.87
Jul-21	105.20	2395.04	105.11	2395.14	91.52	2393.95	91.37	2394.26
Jan-22	104.94	2395.30	104.84	2395.41	91.06	2394.41	91.21	2394.42
Jul-22	104.81	2395.54	104.62	2395.63	90.84	2394.63	91.01	2394.62
Jan-23	104.56	2395.68	104.12	2396.13	90.76	2394.71	90.93	2394.70
Jul-23	104.72	2395.65	104.47	2395.78	90.59	2394.88	90.78	2394.85
Jan-24	104.83	2395.61	104.52	2395.73	90.73	2394.74	90.94	2394.69
Jul-24	105.30	2395.25	104.85	2395.40	90.82	2394.65	91.11	2394.52
Max. Value	**106.12**	**2395.68**	**106.04**	**2396.13**	**92.54**	**2394.88**	**92.66**	**2394.85**
Min. Value	**104.56**	**2394.16**	**104.12**	**2394.21**	**90.59**	**2392.93**	**90.78**	**2392.97**
Deviation	**1.56**	**1.52**	**1.92**	**1.92**	**1.95**	**1.95**	**1.88**	**1.88**
Avg. Value	**105.40**	**2394.89**	**105.27**	**2394.98**	**91.59**	**2393.88**	**91.73**	**2393.90**

	MW-40		MW-40A		MW-41		MW-41A	
	Northing	Easting	Northing	Easting	Northing	Easting	Northing	Easting
	242,865	791,227	242,862	791,217	243,095	791,359	243,108	791,358
	TOC =	2480.01	TOC =	2479.42	TOC =	2489.34	TOC =	2489.88
	WATER LEVEL		WATER LEVEL		WATER LEVEL		WATER LEVEL	
DATE	ft-Btoc	FT-msl	ft-Btoc	FT-msl	ft-Btoc	FT-msl	ft-Btoc	FT-msl
Mar-15	87.97	2392.04	88.06	2391.36	96.66	2392.68	95.65	2394.23
Jul-15	87.88	2392.13	87.92	2391.50	96.70	2392.64	97.34	2392.54
Jan-16	87.58	2392.43	87.61	2391.81	96.48	2392.86	97.11	2392.77
Jul-16	87.36	2392.65	87.35	2392.07	96.27	2393.07	96.94	2392.94
Jan-17	86.86	2393.15	86.82	2392.60	95.89	2393.45	96.48	2393.40
Jul-17	86.90	2393.11	86.96	2392.46	95.89	2393.45	96.56	2393.32
Jan-18	87.17	2392.84	87.24	2392.18	95.91	2393.43	96.58	2393.30
Jul-18	87.48	2392.53	87.56	2391.86	96.31	2393.03	96.97	2392.91
Jan-19	87.91	2392.10	88.04	2391.38	96.64	2392.70	97.28	2392.60
Jul-19	87.75	2392.26	87.62	2391.80	96.41	2392.93	97.03	2392.85
Jan-20	87.53	2392.48	87.61	2391.81	96.35	2392.99	96.98	2392.90
Jul-20	87.45	2392.56	87.42	2392.00	96.25	2393.09	96.84	2393.04
Jan-21	87.22	2392.79	87.21	2392.21	96.03	2393.31	96.66	2393.22
Jul-21	87.04	2392.97	87.05	2392.37	95.90	2393.44	96.53	2393.35
Jan-22	86.51	2393.50	86.49	2392.93	95.41	2393.93	96.17	2393.71
Jul-22	86.44	2393.57	86.39	2393.03	95.37	2393.97	95.98	2393.90
Jan-23	86.31	2393.70	86.24	2393.18	95.21	2394.13	95.65	2394.23
Jul-23	86.25	2393.76	86.19	2393.23	95.18	2394.16	95.82	2394.06
Jan-24	86.47	2393.54	86.44	2392.98	95.29	2394.05	95.94	2393.94
Jul-24	86.52	2393.49	86.42	2393.00	95.51	2393.83	96.10	2393.78
Max. Value	**87.97**	**2393.76**	**88.06**	**2393.23**	**96.70**	**2394.16**	**97.34**	**2394.23**
Min. Value	**86.25**	**2392.04**	**86.19**	**2391.36**	**95.18**	**2392.64**	**95.65**	**2392.54**
Deviation	**1.72**	**1.72**	**1.87**	**1.87**	**1.52**	**1.52**	**1.69**	**1.69**
Avg. Value	**87.13**	**2392.88**	**87.13**	**2392.29**	**95.98**	**2393.36**	**96.53**	**2393.35**

TABLE IX.C.A.(1)(a)-[2]

FLUID LEVEL MEASUREMENTS UNDER CURRENT PERMIT - SITE E



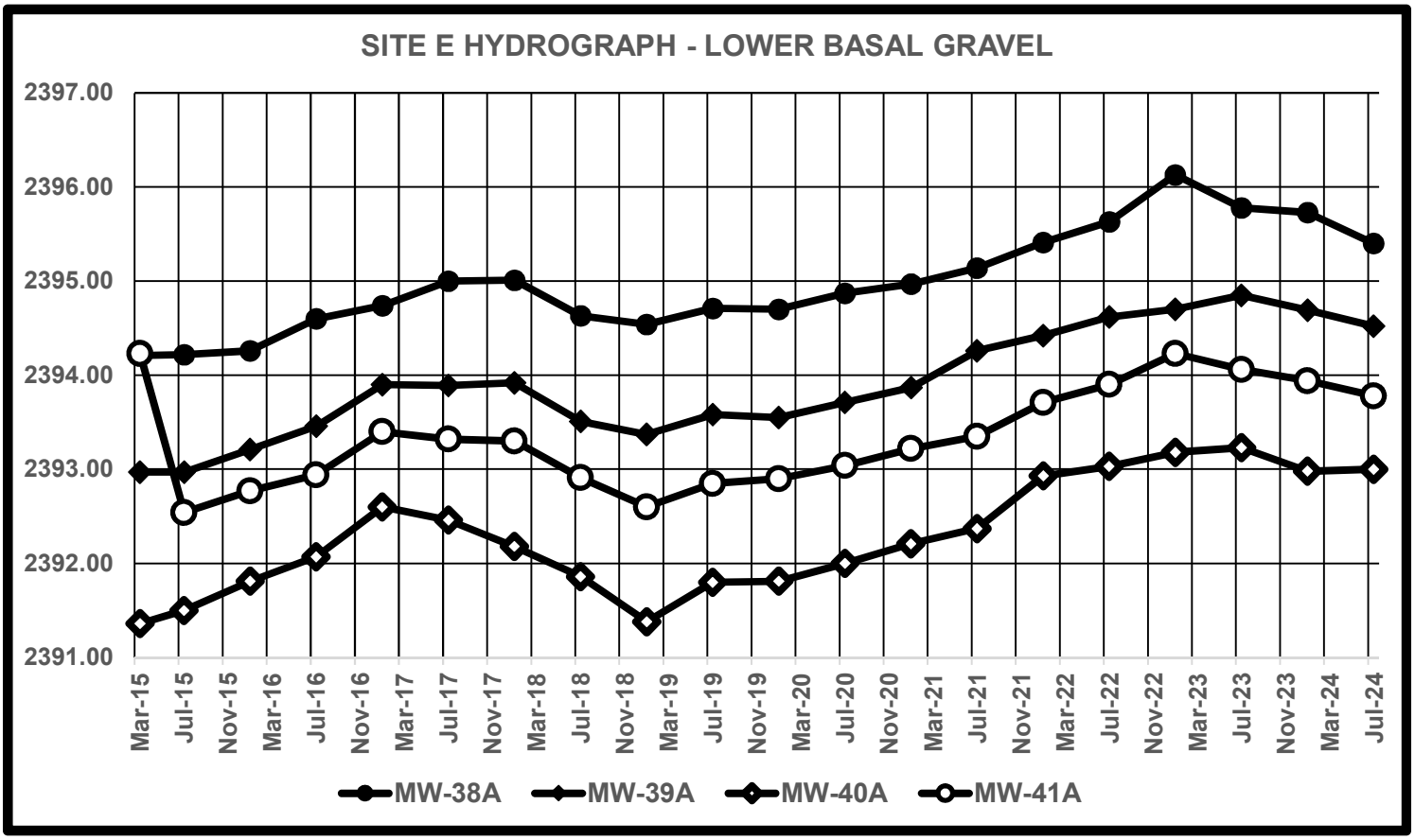


TABLE XI.C.1.a.(1)(f)
SITE E MONITORING PARAMETERS

Compliance Monitoring Program Table of Hazardous and Solid Waste Constlituents (from CP Table IV			
CONSTITUENT	**CAS No.**	**Method**	**MQL (mg/L)**
Benzene	71-43-2	SW846 8260B	0.001
Ethylbenzene	100-41-4	SW846 8260B	0.001
Toluene	108-88-3	SW846 8260B	0.001
Xylenes, total	1330-20-7	SW846 8260B	0.002
Acetone	67-64-1	SW846 8260B	0.05
Carbon disulfide	75-15-0	SW846 8260B	0.001
Methyl ethyl Ketone	78-93-3	SW846 8260B	0.013
Benzenethiol	108-98-5	SW846 8270D	0.049
Cresols, totals	95-48-7	SW846 8270D	0.049
Diethyl phthalate	84-66-2	SW846 8270D	0.049
2,4-Dimethylphenol	105-67-9	SW846 8270D	0.049
1-Methyl naphthalene	90-12-0	SW846 8270D	0.0019
2-Methyl naphthalene	91-57-6	SW846 8270D	0.0019
Napthalene	91-20-3	SW846 8270D	0.0019
Pentachlorophenol	87-86-5	SW846 8270D	0.097
Phenol	108-95-2	SW846 8270D	0.049
Pyridine	110-86-1	SW846 8270D	0.049
Arsenic	7440-38-2	SW846 6020A	0.005
Beryllium	7440-41-7	SW846 6020A	0.005
Nickel	7440-02-0	SW846 6020A	0.005
Selenium	7782-49-2	SW846 6020A	0.025
Vanadium	7440-62-2	SW846 6020A	0.005

Compliance Monitoring Program Table of Detected Hazardous Constituents (from CP Table IVA)			
CONSTITUENT	**CAS No.**	**Method**	**$^{GW}GW_{Class3}$**
Benzene	71-43-2	SW846 8260B	0.5
Ethylbenzene	100-41-4	SW846 8260B	70
Toluene	108-88-3	SW846 8260B	100
Xylenes, total	1330-20-7	SW846 8260B	1000
Benzenethiol	108-98-5	SW846 8270D	0.24

TABLE XI.C.1.A.(1)(d)
ALL MONITOR WELLS CURRENTLY UTILIZED

WELL NUMBER	PERMIT PROG	WELL PURPOSE	Texas State Plane Coordinate Grid System		GPS Location Coordinate System		T Depth Drillied (ft-BG)	Screen Interval	
			NORTHING	EASTING	LAT	LONG		TOP (bTOC)	BOTTOM (bTOC)
BICA AREA MONITORING									
MW-52	BICA / H	Background	247820.40	790138.40	32.28599	-101.41615	120.0	107.8	127.8
MW-52A	BICA / H	Background	247818.20	790127.30	32.28598	-101.41618	160.0	139.7	159.7
MW-76	BICA / H	Background	247976.00	790629.76	32.28646	101.41458	130.0	102.8	122.8
MW-76A	BICA / H	Background	247974.81	790620.73	32.28646	101.41461	180.0	140.9	160.9
MW-78	BICA	POC	237751.18	791127.67	32.25843	101.41174	65.0	41.7	61.7
MW-79	BICA	POC	237967.67	792296.12	32.25914	101.40798	80.0	53.9	73.9
MW-79A	BICA	POC	237965.10	792288.00	32.25913	101.40801	120.0	93.7	113.7
MW-80	BICA	POC	238485.73	790471.29	32.26038	101.41395	130.0	63.8	83.8
MW-80A	BICA	POC	238541.72	790460.44	32.26053	101.41399	120.0	80.9	110.9
MW-109	BICA	POC	236671.40	791458.77	32.25550	101.41053	40.0	6.0	25.0
MW-109A	BICA	POC	236684.80	791463.31	32.25553	101.41052	35.0	17.0	27.0
MW-125	BICA	POC	238434.70	789189.30	32.26011	-101.41808	100.0	70.9	80.9
MW-125A	BICA	POC	238427.70	789195.30	32.26009	-101.41806	100.0	72.8	92.8
IW-149	BICA	POC	239410.09	794536.76	32.26333	101.40091	120.0	62.2	82.2
IW-149A	BICA	POC	239422.04	794537.69	32.26337	101.40091	110.0	88.2	100.7
IW-150	BICA	POC	236496.47	794259.34	32.25530	101.40146	60.0	30.2	40.2
IW-150A	BICA	POC	236473.16	794262.68	32.25524	101.40145	60.0	41.2	51.2
MW-152	BICA	POC	242601.34	787822.22	32.27141	101.42301	115.0	80.7	100.7
MW-152A	BICA	POC	242600.51	787811.18	32.27141	101.42304	135.0	108.7	118.7
MW-153	BICA	POC	242417.73	786548.60	32.27078	101.42710	90.0	59.8	79.8
MW-153A	BICA	POC	242415.04	786535.93	32.27077	101.42714	100.0	79.7	89.7
MW-154	BICA	POC	240331.22	787129.99	32.26511	101.42497	120.0	67.7	87.7
MW-154A	BICA	POC	240341.22	787129.83	32.26513	101.42497	120.0	94.7	104.7
MW-155	BICA	POC	240881.98	795495.39	32.26747	101.39799	97.0	71.0	91.0
MW-155A	BICA	POC	240881.11	795473.86	32.26747	101.39806	120.0	99.9	109.9
MW-214	BICA	POC	243573.40	793754.66	32.27469	101.40394	120.0	81.0	101.0
MW-214A	BICA	POC	243560.94	793756.82	32.27466	101.40393	130.0	118.0	123.0
MW-218	BICA	POC	241950.87	794588.71	32.27032	101.40101	105.0	83.3	103.3
MW-218A	BICA	POC	241951.51	794600.30	32.27032	101.40105	103.0	114.0	119.0
MW-220	BICA	POC	244721.80	792847.77	32.27775	101.40701	115.0	92.1	112.1
MW-220A	BICA	POC	244737.04	792839.00	32.27779	101.40704	140.0	132.9	137.9
MW-221	BICA	POC	245810.86	791199.38	32.28057	101.41247	130.0	106.2	126.2
MW-221A	BICA	POC	245814.65	791214.79	32.28059	101.41243	160.0	153.1	158.1
MW-223	BICA	POC	246138.03	792439.71	32.28160	101.40850	120.0	101.1	121.1
MW-223A	BICA	POC	246140.80	792455.55	32.28161	101.40845	150.0	143.0	148.0
MW-224	BICA	POC	246794.51	792342.87	32.28339	101.40890	140.0	114.1	134.1
MW-224A	BICA	POC	246787.86	792356.74	32.28338	101.40885	160.0	155.1	160.1
MW-225	BICA	POC	243803.09	787714.58	32.27470	101.42350	100.0	79.8	99.8
MW-225A	BICA	POC	243815.77	787711.89	32.27474	101.42351	115.0	108.1	113.1
MW-227	BICA	POC	245006.58	787568.89	32.27799	101.42412	110.0	81.8	101.8
MW-227A	BICA	POC	245019.43	787559.66	32.27803	101.42415	128.0	122.0	127.0
SITE H PROGRAM									
MW-52	BICA / H	Background	247820.40	790138.40	32.28599	-101.41615	120.0	107.8	127.8
MW-52A	BICA / H	Background	247818.20	790127.30	32.28598	-101.41618	160.0	139.7	159.7
MW-53	SITE H	POC	247196.80	790619.60	32.28432	-101.41452	130.0	96.0	116.0
MW-53A	SITE H	POC	247195.70	790608.50	32.28432	-101.41455	138.0	117.0	137.0
MW-54	SITE H	POC	247067.60	790035.90	32.28391	-101.41639	150.0	98.5	118.5
MW-54A	SITE H	POC	247060.30	790053.30	32.28389	-101.41633	150.0	118.0	138.0
MW-74	SITE H	POC	247164.60	790468.00	32.28422	-101.41500	120.0	94.0	114.0
MW-74A	SITE H	POC	247162.30	790458.60	32.28421	-101.41503	170.0	126.0	146.0
MW-75	SITE H	POC	247088.80	790222.10	32.28398	-101.41579	130.0	95.0	115.0

TABLE XI.C.1.A.(1)(d)
ALL MONITOR WELLS CURRENTLY UTILIZED

WELL NUMBER	PERMIT PROG	WELL PURPOSE	Texas State Plane Coordinate Grid System		GPS Location Coordinate System		T Depth Drillied (ft-BG)	Screen Interval	
			NORTHING	EASTING	LAT	LONG		TOP (bTOC)	BOTTOM (bTOC)
MW-75A	SITE H	POC	247091.90	790230.20	32.28399	-101.41576	160.0	135.0	155.0
MW-76	BICA / H	Background	247976.00	790629.76	32.28646	101.41458	130.0	102.8	122.8
MW-76A	BICA / H	Background	247974.81	790620.73	32.28646	101.41461	180.0	140.9	160.9
MW-77	SITE H	POC	247474.50	790109.50	32.28503	-101.41620	130.0	100.0	120.0
MW-77A	SITE H	POC	247481.80	790113.40	32.28505	-101.41619	160.0	130.0	150.0

Table XI.C.1.a.(1)(h)

HISTORICAL ANALYTICAL RESULTS - SITE E

Well	Constit.	GWPS mg/L	OCT-87	FEB-88	JUN-88	SEP-88	JAN-89	APR-89	JUL-89	OCT-89	JAN-90	APR-90	JUL-90	OCT-90	JAN-91	APR-91	JUL-91	OCT-91	JAN-92
MW-38	Acetone	2200																	
MW-38	Benzene	0.5	0.110	0.580	0.480	0.400	0.597	0.388	0.883	0.418	0.402	0.559	0.483	0.469	0.140	0.317	0.314	0.190	0.227
MW-38	Ethylbenzene	70																	
MW-38	Methyl Ethyl Ketone	1500																	
MW-38	Toluene	100																	
MW-38	Xylenes	1000																	
MW-38	Benzenethiol	0.24																	
MW-38	Cresols, totals	120																	
MW-38	Diethyl phthalate	2000																	
MW-38	2,4-Dimethylphenol	49																	
MW-38	1-Methyl naphthalene	3.1																	
MW-38	2-Methyl naphthalene	9.8																	
MW-38	Carbon disulfide	240																	
MW-38	Napthalene	49																	
MW-38	Pentachlorophenol	0.1																	
MW-38	Phenol	730																	
MW-38	Pyridine	2.4																	
MW-38	Arsenic	1																	
MW-38	Beryllium	0.4																	
MW-38	Nickel	49																	
MW-38	Selenium	5																	
MW-38	Vanadium	4.4																	
MW-38A	Acetone	2200																	
MW-38A	Benzene	0.5	0.260	0.037	0.036	0.007	0.051	0.070	0.126	0.214	0.275	0.249	0.299	0.389	0.360	0.324	0.215	0.410	0.386
MW-38A	Ethylbenzene	70																	
MW-38A	Methyl Ethyl Ketone	1500																	
MW-38A	Toluene	100																	
MW-38A	Xylenes	1000																	
MW-38A	Benzenethiol	0.24																	
MW-38A	Cresols, totals	120																	
MW-38A	Diethyl phthalate	2000																	
MW-38A	2,4-Dimethylphenol	49																	
MW-38A	1-Methyl naphthalene	3.1																	
MW-38A	2-Methyl naphthalene	9.8																	
MW-38A	Carbon disulfide	240																	
MW-38A	Napthalene	49																	
MW-38A	Pentachlorophenol	0.1																	
MW-38A	Phenol	730																	
MW-38A	Pyridine	2.4																	
MW-38A	Arsenic	1																	
MW-38A	Beryllium	0.4																	
MW-38A	Nickel	49																	
MW-38A	Selenium	5																	
MW-38A	Vanadium	4.4																	

Table XI.C.1.a.(1)(h)

HISTORICAL ANALYTICAL RESULTS - SITE E

Well	Constit.	GWPS mg/L	APR-92	JUL-92	OCT-92	JAN-93	MAR-93	JUL-93	OCT-93	FEB-94	APR-94	JUL-94	OCT-94	JAN-95	APR-95	JUL-95	OCT-95	JAN-96	JUL-96
MW-38	Acetone	2200																	
MW-38	Benzene	0.5																	
MW-38	Ethylbenzene	70																	
MW-38	Methyl Ethyl Ketone	1500																	
MW-38	Toluene	100																	
MW-38	Xylenes	1000																	
MW-38	Benzenethiol	0.24																	
MW-38	Cresols, totals	120																	
MW-38	Diethyl phthalate	2000																	
MW-38	2,4-Dimethylphenol	49																	
MW-38	1-Methyl naphthalene	3.1																	
MW-38	2-Methyl naphthalene	9.8																	
MW-38	Carbon disulfide	240																	
MW-38	Napthalene	49																	
MW-38	Pentachlorophenol	0.1																	
MW-38	Phenol	730																	
MW-38	Pyridine	2.4																	
MW-38	Arsenic	1																	
MW-38	Beryllium	0.4																	
MW-38	Nickel	49																	
MW-38	Selenium	5																	
MW-38	Vanadium	4.4																	
MW-38A	Acetone	2200																	
MW-38A	Benzene	0.5																	
MW-38A	Ethylbenzene	70																	
MW-38A	Methyl Ethyl Ketone	1500																	
MW-38A	Toluene	100																	
MW-38A	Xylenes	1000																	
MW-38A	Benzenethiol	0.24																	
MW-38A	Cresols, totals	120																	
MW-38A	Diethyl phthalate	2000																	
MW-38A	2,4-Dimethylphenol	49																	
MW-38A	1-Methyl naphthalene	3.1																	
MW-38A	2-Methyl naphthalene	9.8																	
MW-38A	Carbon disulfide	240																	
MW-38A	Napthalene	49																	
MW-38A	Pentachlorophenol	0.1																	
MW-38A	Phenol	730																	
MW-38A	Pyridine	2.4																	
MW-38A	Arsenic	1																	
MW-38A	Beryllium	0.4																	
MW-38A	Nickel	49																	
MW-38A	Selenium	5																	
MW-38A	Vanadium	4.4																	

Table XI.C.1.a.(1)(h)

HISTORICAL ANALYTICAL RESULTS - SITE E

Well	Constit.	GWPS mg/L	JAN-97	JUL-97	JAN-98	JUL-98	Jan-99	Jan-00	Jul-00	Jan-01	Jul-01	Jan-02	Jul-02	Jan-03	Jul-03	Jan-04	Jul-04	Jan-05
MW-38	Acetone	2200										<0.1	<0.1				<1	<0.1
MW-38	Benzene	0.5										**0.140**	**0.110**				**0.100**	**0.120**
MW-38	Ethylbenzene	70										**0.15**	**0.12**				**0.11**	**0.096**
MW-38	Methyl Ethyl Ketone	1500										<0.1	<0.1				<1	<0.1
MW-38	Toluene	100										**0.037**	**0.029**				**<0.05**	**0.034**
MW-38	Xylenes	1000										**0.0750**	**0.0600**				**<0.05**	**0.0590**
MW-38	Benzenethiol	0.24										**0.0730**	<2.5				<.02	<1
MW-38	Cresols, totals	120										**2.800**	**2.000**				**1.700**	**3.000**
MW-38	Diethyl phthalate	2000										<0.02	<0.1				<0.2	<0.1
MW-38	2,4-Dimethylphenol	49										**2.00000**	**1.50000**				**1.20000**	**1.70000**
MW-38	1-Methyl naphthalene	3.1										**0.0900**	<0.1				<0.2	**0.1000**
MW-38	2-Methyl naphthalene	9.8										**0.0290**	<0.1				<0.2	<0.1
MW-38	Carbon disulfide	240										<0.005	<0.005				<0.05	<0.005
MW-38	Napthalene	49										**0.066**	<0.1				<0.2	<0.1
MW-38	Pentachlorophenol	0.1										**0.012**	<0.5				<0.1	<0.05
MW-38	Phenol	730										<0.02	<0.1				<0.2	<0.1
MW-38	Pyridine	2.4										<0.02	<0.1				<0.2	<0.1
MW-38	Arsenic	1										**0.128**	**0.1**				**0.276**	**0.0889**
MW-38	Beryllium	0.4										<0.003	<0.003				<0.003	<0.003
MW-38	Nickel	49										**0.052**	<0.05				**0.053**	**0.0505**
MW-38	Selenium	5										<0.02	<0.02				<0.02	<0.02
MW-38	Vanadium	4.4										<0.08	<0.08				<0.08	<0.08
MW-38A	Acetone	2200									<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
MW-38A	Benzene	0.5									**0.140**	**0.200**	**0.170**	**0.190**	**0.140**	**0.140**	**0.130**	**0.150**
MW-38A	Ethylbenzene	70									**0.120**	**0.15**	**0.140**	**0.15**	**0.120**	**0.14**	**0.120**	**0.11**
MW-38A	Methyl Ethyl Ketone	1500									<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
MW-38A	Toluene	100									**0.039**	**0.07**	**0.057**	**0.056**	**0.040**	**0.049**	**0.044**	**0.046**
MW-38A	Xylenes	1000									**0.0640**	**0.0980**	**0.0860**	**0.0820**	**0.0630**	**0.0670**	**0.0580**	**0.0570**
MW-38A	Benzenethiol	0.24									<0.0025	<0.5	<1	<0.5	<1	<1	<0.2	<2.5
MW-38A	Cresols, totals	120									**0.160**	**2.200**	**0.150**	**0.057**	**0.073**	<0.04	<0.02	**0.560**
MW-38A	Diethyl phthalate	2000									<0.1	<0.02	<0.04	<0.02	<0.04	<0.04	<0.02	<0.1
MW-38A	2,4-Dimethylphenol	49									**0.80000**	**1.40000**	**0.25000**	**0.11000**	**0.19000**	**0.09300**	**0.04000**	**0.45000**
MW-38A	1-Methyl naphthalene	3.1									<0.1	**0.1400**	**0.0920**	**0.1100**	**0.1200**	**0.1000**	**0.0980**	**0.1000**
MW-38A	2-Methyl naphthalene	9.8									**0.2000**	**0.1600**	**0.1000**	**0.1300**	**0.1300**	**0.0950**	**0.0390**	<0.1
MW-38A	Carbon disulfide	240									<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
MW-38A	Napthalene	49									**0.200**	**0.160**	**0.110**	**0.071**	**0.130**	**0.100**	**0.048**	<0.1
MW-38A	Pentachlorophenol	0.1									<0.05	**0.013**	<0.02	<0.01	<0.02	<0.02	<0.01	<0.05
MW-38A	Phenol	730									<0.1	<0.02	<0.04	<0.02	<0.04	<0.04	<0.02	<0.1
MW-38A	Pyridine	2.4									<0.1	<0.02	<0.04	<0.02	<0.04	<0.04	<0.02	<0.1
MW-38A	Arsenic	1									**0.0601**	**0.101**	**0.07**	**0.0619**	**0.0716**	**0.0667**	**0.063**	**0.0656**
MW-38A	Beryllium	0.4									<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
MW-38A	Nickel	49									**0.059**	**0.054**	**0.058**	**0.051**	<0.05	<0.05	**0.051**	<0.05
MW-38A	Selenium	5									<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW-38A	Vanadium	4.4									<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08

Table XI.C.1.a.(1)(h)

HISTORICAL ANALYTICAL RESULTS - SITE E

Well	Constit.	GWPS mg/L	Apr-05	Jul-05	Jan-06	Jul-06	Jan-07	Jul-07	Jan-08	Jul-08	Jan-09	Jul-09	Jan-10	Jul-10	Jan-11	Jul-11	Jan-12
MW-38	Acetone	2200		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.013	<0.1	0.0564	0.0233
MW-38	Benzene	0.5		0.120	0.100	0.120	0.120	0.13	0.120	0.160	0.170	0.040	0.060	0.077	0.059	0.0531	0.0941
MW-38	Ethylbenzene	70	0.1	0.1	0.1		0.1	0.091	0.072	0.18	0.18	0.019	0.039	0.034	0.031	0.0228	0.0501
MW-38	Methyl Ethyl Ketone	1500		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.012	<0.1	0.0136	<0.0018
MW-38	Toluene	100	0.031	0.027	0.032		0.033	0.03	0.03	0.042	0.39	0.0087	0.014	0.016	0.013	0.0112	0.0201
MW-38	Xylenes	1000	0.0640	0.0560	0.0610		0.0650	0.0580	0.0500	0.1070	0.0870	0.0147	0.0280	0.0280	0.0207	0.0183	0.0336
MW-38	Benzenethiol	0.24	<0.5	<0.5	<0.5		<0.5	<0.5		<0.025	<0.25						
MW-38	Cresols, totals	120		1.400	0.860	1.400	1.700	1.900	3.339	2.800	1.500	2.300	1.100	1.900	0.320	0.2840	0.004
MW-38	Diethyl phthalate	2000		<0.1	<0.1	<0.1	<0.1	<0.1	<0.01	<0.05	<0.05	<0.04	<0.054	<0.054	<0.02	<0.022	<0.0011
MW-38	2,4-Dimethylphenol	49		0.89000	0.21000	<0.5	1.00000	1.00000	0.49000	1.50000	0.86000	1.20000	0.84000	1.00000	0.40000	0.39200	0.18300
MW-38	1-Methyl naphthalene	3.1		<0.1	<0.1	0.0950	<0.1	<0.1	0.1200	0.1100	0.0650	0.0820	0.1100	0.1200	0.1000	0.0968	0.0852
MW-38	2-Methyl naphthalene	9.8		<0.1	<0.1	<0.1	<0.1	<0.1	<0.01	<0.05	<0.05	<0.04	<0.054	<0.054	<0.02	<0.026	<0.0013
MW-38	Carbon disulfide	240		<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.00036	<0.00036
MW-38	Napthalene	49		<0.1	<0.1	<0.1	<0.1	<0.1	0.048	<0.05	<0.05	<0.04	<0.054	<0.054	<0.02	<0.023	0.0121
MW-38	Pentachlorophenol	0.1		<0.05	<0.05	<0.05	<0.05	<0.05	<0.005	<0.005	<0.025	<0.02	<0.027	<0.27	<0.1	0.0124	0.0109
MW-38	Phenol	730		<0.1	<0.1	<0.1	<0.1	<0.01	<0.01	<0.05	<0.05	<0.04	<0.054	<0.054	<0.02	<0.016	<0.00076
MW-38	Pyridine	2.4		<0.1	<0.1	<0.1	<0.1	<0.1	<0.01	<0.05	<0.05	<0.04	<0.054	<0.054	<0.02	<0.02	<0.001
MW-38	Arsenic	1		0.0763	0.0802	0.0929	0.0754	0.0646		0.0759	0.0737						
MW-38	Beryllium	0.4		<0.003	<0.003	<0.003	<0.003	<0.003	<0.004	<0.004	<0.004	<0.004	<0.02	<0.005	<0.04	0.000800	<0.001
MW-38	Nickel	49	0.052	<0.05	<0.05	0.0551	<0.05	0.0623	0.0494	0.0682	0.0536		0.0606	0.0428	0.0568	0.0372	0.0401
MW-38	Selenium	5		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.1	<0.01	<0.2	0.00089	<0.001
MW-38	Vanadium	4.4		<0.08	<0.08	<0.08	<0.08	<0.08	<0.005	<0.005	0.0175	<0.005	<0.025	<0.005	<0.05	0.0018	<0.002
MW-38A	Acetone	2200		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.012	<0.1	0.02	0.062
MW-38A	Benzene	0.5		0.230	0.210	0.210	0.190	0.20	0.150	0.180	0.160	0.150	0.130	0.160	0.110	0.208	0.144
MW-38A	Ethylbenzene	70	0.13	0.11	0.086		0.1	0.094	0.067	0.16	0.12	0.077	0.072	0.078	0.061	0.073	0.0713
MW-38A	Methyl Ethyl Ketone	1500		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.012	<0.1	<0.0018	0.019
MW-38A	Toluene	100	0.055	0.065	0.067		0.068	0.049	0.043	0.053	0.046	0.037	0.033	0.036	0.027	0.0683	0.0362
MW-38A	Xylenes	1000	0.0720	0.0710	0.0650		0.0730	0.0550	0.0460	0.0930	0.0640	0.0440	0.0380	0.0410	0.0330	0.0954	0.0473
MW-38A	Benzenethiol	0.24	<0.5	<0.5	<0.25		<0.5	<0.5		<0.05	<0.25						
MW-38A	Cresols, totals	120		1.100	0.460	1.200	0.660	<0.1	0.300	0.071	0.094	0.062	0.089	0.410	0.743	4.8681	0.019
MW-38A	Diethyl phthalate	2000		<0.1	<0.1	<0.05	<0.1	<0.1	<0.01	<0.05	<0.05	<0.04	<0.052	<0.052	<0.02	<0.022	<0.0011
MW-38A	2,4-Dimethylphenol	49		0.88000	0.77000	1.40000	1.40000	0.34000	0.17000	0.25000	0.38000	0.14000	0.18000	0.31000	0.36000	2.80000	0.41000
MW-38A	1-Methyl naphthalene	3.1		0.1100	<0.1	0.1100	<0.1	0.10	0.1300	0.0700	0.1300	0.0840	0.1200	0.1400	0.1400	0.1450	0.0925
MW-38A	2-Methyl naphthalene	9.8		<0.1	<0.1	<0.05	<0.1	<0.1	<0.01	<0.05	<0.05	<0.04	<0.052	<0.052	<0.02	<0.026	0.0066
MW-38A	Carbon disulfide	240		<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.0005	0.0013
MW-38A	Napthalene	49		<0.1	<0.1	0.059	<0.1	<0.1	0.041	<0.05	0.065	0.042	0.063	0.071	0.079	0.0949	0.0588
MW-38A	Pentachlorophenol	0.1		<0.05	<0.05	<0.025	<0.05	<0.05	<0.005	<0.025	<0.025	<0.02	<0.026	<0.26	<0.1	0.037	0.0146
MW-38A	Phenol	730		<0.1	<0.1	<0.05	<0.1	<0.01	<0.01	<0.05	<0.05	<0.04	<0.052	<0.052	<0.02	<0.015	<0.00078
MW-38A	Pyridine	2.4		<0.1	<0.1	<0.05	<0.1	<0.1	<0.01	<0.05	<0.05	<0.04	<0.052	<0.052	<0.02	<0.02	<0.001
MW-38A	Arsenic	1		0.0816	0.0905	0.094	0.0686	0.0555		0.0531	0.0478						
MW-38A	Beryllium	0.4		<0.003	<0.003	<0.003	<0.003	<0.003	<0.004	<0.004	<0.004	<0.004	<0.02	<0.005	<0.04	0.000120	<0.005
MW-38A	Nickel	49	0.0536	0.0538	0.061	0.0619	0.0608	0.0579	0.0517	0.0896	0.0374		0.0599	0.0309	0.0793	0.0488	0.0321
MW-38A	Selenium	5		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.1	<0.01	<0.4	0.00093	<0.00083
MW-38A	Vanadium	4.4		<0.08	<0.08	<0.08	<0.08	<0.08	0.0094	<0.005	0.0238	<0.005	<0.025	<0.005	<0.05	0.0064	<0.01

Table XI.C.1.a.(1)(h)

HISTORICAL ANALYTICAL RESULTS - SITE E

Well	Constit.	GWPS mg/L	Jul-12	Jan-13	Jul-13	Jan-14	Jul-14	Mar-15	Jul-15	Jan-16	Jul-16	Jan-17	Jul-17	Jan-18	Jul-18	Jan-19	Jul-19	Jan-20	Jul-20
MW-38	Acetone	2200	0.0246	0.0269	0.0298	0.0118													
MW-38	Benzene	0.5	0.0326	0.0347	0.0888	0.0584	0.0337	0.178	0.18	0.177	0.182	0.181	0.153	0.172	0.221	0.236	0.185	0.231	0.242
MW-38	Ethylbenzene	70	0.0119	0.0138	0.0314	0.0222	0.011	0.0737	0.0564	0.0621	0.0717	0.0718	0.0718	0.0642	0.0793	0.0792	0.0578	0.0707	0.0777
MW-38	Methyl Ethyl Ketone	1500	0.008	0.005	0.0081	0.003													
MW-38	Toluene	100	0.0057	0.0065	0.0142	0.0106	0.0057	0.0359	0.0359	0.0295	0.0342	0.0405	0.0417	0.0386	0.0500	0.0507	0.0369	0.0511	0.0533
MW-38	Xylenes	1000	0.0097	0.0126	0.0247	0.0165	0.0089	0.0468	0.0468	0.0364	0.0405	0.0443	0.0500	0.0386	0.0500	0.0591	0.0448	0.0568	0.0581
MW-38	Benzenethiol	0.24		0.0771	0.0935	0.1640	0.0781	0.0366	0.1080	0.0457	0.0312	0.0288	0.0288	0.0349	0.0483	0.0306	0.0353	0.0324	0.0363
MW-38	Cresols, totals	120	0.003	0.005	<0.0048	0.0098													
MW-38	Diethyl phthalate	2000	0.0012	<0.0061	<0.0061	<0.0058													
MW-38	2,4-Dimethylphenol	49	0.11900	0.32100	0.05780	0.11100													
MW-38	1-Methyl naphthalene	3.1	0.0686	0.0797	0.0659	0.0826													
MW-38	2-Methyl naphthalene	9.8	<0.0013	<0.0048	<0.0048	<0.0052													
MW-38	Carbon disulfide	240	<0.00036	<0.00036	<0.00036	<0.00036													
MW-38	Napthalene	49	0.0088	0.0115	0.008	0.0082													
MW-38	Pentachlorophenol	0.1	0.0037	0.003	0.0022	0.0023													
MW-38	Phenol	730	0.0013	<0.0059	<0.0059	<0.0061													
MW-38	Pyridine	2.4	<0.0010	<0.017	<0.017	<0.0053													
MW-38	Arsenic	1		0.0937	0.0905	0.0973													
MW-38	Beryllium	0.4	<0.00064	<0.00064	<0.00064	<0.00064													
MW-38	Nickel	49	0.0433	0.0505	0.0453	0.0469													
MW-38	Selenium	5	0.0022	<0.0014	0.002	0.0046													
MW-38	Vanadium	4.4	0.0011	0.0023	0.0028	0.0024													
MW-38A	Acetone	2200	0.0181	0.0655	0.0355	0.0357													
MW-38A	Benzene	0.5	0.188	0.162	0.197	0.18	0.158	0.145	0.179	0.242	0.242	0.331	0.431	0.332	0.461	0.468	0.298	0.359	0.199
MW-38A	Ethylbenzene	70	0.0557	0.0652	0.0971	0.0847	0.0854	0.0992	0.0697	0.0564	0.0608	0.0773	0.0773	0.0762	0.0814	0.0965	0.066	0.0824	0.0867
MW-38A	Methyl Ethyl Ketone	1500	0.005	0.035	0.0163	0.0157													
MW-38A	Toluene	100	0.0466	0.0355	0.0495	0.0419	0.0406	0.0413	0.0413	0.0412	0.0423	0.0430	0.0582	0.0550	0.0636	0.0166	0.0482	0.0617	0.0448
MW-38A	Xylenes	1000	0.0611	0.0484	0.0791	0.0551	0.0551	0.0622	0.0622	0.0507	0.0408	0.0395	0.0591	0.0550	0.0636	0.0696	0.0463	0.0582	0.0463
MW-38A	Benzenethiol	0.24		0.0827	0.2400	0.1150	0.0117	0.0548	0.1670	0.2930	0.0771	0.1090	0.1090	0.1420	0.1380	0.0449	0.0487	0.0430	0.0334
MW-38A	Cresols, totals	120	0.024	0.027	0.3222	0.1266													
MW-38A	Diethyl phthalate	2000	<0.0043	<0.0061	<0.0061	<0.0056													
MW-38A	2,4-Dimethylphenol	49	1.72000	0.66800	1.12000	0.77100													
MW-38A	1-Methyl naphthalene	3.1	0.0339	0.1310	0.1570	0.1750													
MW-38A	2-Methyl naphthalene	9.8	0.0228	0.0087	0.0080	0.0086													
MW-38A	Carbon disulfide	240	<0.00036	0.000	0.00043	0.0004													
MW-38A	Napthalene	49	0.222	0.0729	0.0696	0.062													
MW-38A	Pentachlorophenol	0.1	0.0238	0.0044	0.0086	0.0042													
MW-38A	Phenol	730	<0.003	<0.0059	<0.0059	<0.0059													
MW-38A	Pyridine	2.4	<0.004	<0.017	<0.017	<0.0051													
MW-38A	Arsenic	1		0.0423	0.0543	0.0469													
MW-38A	Beryllium	0.4	<0.00064	<0.00064	<0.00064	<0.0064													
MW-38A	Nickel	49	0.06	0.033	0.0406	0.0351													
MW-38A	Selenium	5	0.0032	<0.0027	0.0025	0.0043													
MW-38A	Vanadium	4.4	0.0069	0.0056	0.0075	0.006													

Table XI.C.1.a.(1)(h)

HISTORICAL ANALYTICAL RESULTS - SITE E

Well	Constit.	GWPS mg/L	Jan-21	Jul-21	Jan-22	Jul-22	Jan-23	Jul-23	Jan-24	Jul-24	# Data	Date First Analysis	Max. Value (mg/L)	# Data >GWPS	Date Last >GWPS	# Data >MDL
MW-38	Acetone	2200	<0.10		0.0216		0.0121				25	Jan-02	0.0564	0	na	9
MW-38	Benzene	0.5	0.285	0.3580	0.3100		0.402				56	Oct-87	0.883	4	Apr-90	55
MW-38	Ethylbenzene	70	0.0747	0.0771	0.0676		0.0834				39	Jan-02	0.18	0	na	39
MW-38	Methyl Ethyl Ketone	1500	<0.017		0.0049		0.002				25	Jan-02	0.0136	0	na	7
MW-38	Toluene	100	0.0544	0.0692	0.0648		0.0820	0.1700	0.2500	0.3900	42	Jan-02	0.39	0	na	41
MW-38	Xylenes	1000	0.0573	0.0683	0.0563		0.0694				39	Jan-02	0.107	0	na	38
MW-38	Benzenethiol	0.24	0.0297	0.0551	0.0354		0.0312				31	Jan-02	0.164	0	na	21
MW-38	Cresols, totals	120	0.0058		0.0045		0.004				25	Jan-02	3.339	0	na	24
MW-38	Diethyl phthalate	2000	<0.001		<0.0048		0.0167				25	Jan-02	0.0167	0	na	2
MW-38	2,4-Dimethylphenol	49	0.03490		0.02410		0.04010				25	Jan-02	2	0	na	24
MW-38	1-Methyl naphthalene	3.1	0.0840		0.0779		0.0796				25	Jan-02	0.12	0	na	19
MW-38	2-Methyl naphthalene	9.8	<0.0013		<0.0048		<0.00032				25	Jan-02	0.029	0	na	1
MW-38	Carbon disulfide	240	<0.010		<0.010		<0.00027				25	Jan-02	0	0	na	0
MW-38	Napthalene	49	0.0115		0.0106		0.0104				25	Jan-02	0.066	0	na	10
MW-38	Pentachlorophenol	0.1	0.0034		0.0025		0.0161				25	Jan-02	0.0161	0	na	10
MW-38	Phenol	730	0.0014		<0.0048		<0.0004				25	Jan-02	0.0014	0	na	2
MW-38	Pyridine	2.4	<0.0011		<0.0048		<0.0037				25	Jan-02	0	0	na	0
MW-38	Arsenic	1	0.178		0.0934		0.0981				17	Jan-02	0.276	0	na	16
MW-38	Beryllium	0.4	<0.0005		<0.001		<0.0038				25	Jan-02	0.0008	0	na	1
MW-38	Nickel	49	0.0826		0.0412		0.0436				25	Jan-02	0.0826	0	na	21
MW-38	Selenium	5	0.0028		<0.005		<0.014				25	Jan-02	0.0046	0	na	5
MW-38	Vanadium	4.4	0.0028		0.0015		<0.0018				25	Jan-02	0.0175	0	na	8
MW-38A	Acetone	2200	<0.10		<0.250	<0.0011	0.0258		<0.0057		31	Jul-01	0.0655	0	na	7
MW-38A	Benzene	0.5	0.171	0.1100	0.164	0.1990	0.3990	0.3900	0.3700	0.4090	64	Oct-87	0.468	0	na	63
MW-38A	Ethylbenzene	70	0.0878	0.0764	0.0737	0.0848	0.0889	0.0992	0.101	0.11	47	Jul-01	0.16	0	na	47
MW-38A	Methyl Ethyl Ketone	1500	<0.017		0.009	<0.00078	0.0072		<0.0039		31	Jul-01	0.0347	0	na	7
MW-38A	Toluene	100	0.0379	0.0297	0.0345	0.0438	0.0729	0.0668	0.0723	0.0727	47	Jul-01	0.0729	0	na	47
MW-38A	Xylenes	1000	0.0405	0.0416	0.0369	0.0406	0.0599	0.0663	0.0672	0.0717	47	Jul-01	0.098	0	na	47
MW-38A	Benzenethiol	0.24	0.0132	0.0430	0.0169	<0.00012	0.0342	<0.0011	0.0376	0.0573	39	Jul-01	0.293	1	Jan-16	22
MW-38A	Cresols, totals	120	0.0055		0.004	<0.000028	0.004		0.0098		31	Jul-01	4.8681	0	na	27
MW-38A	Diethyl phthalate	2000	<0.001		<0.0049	0.0091	0.0143		<0.00074		31	Jul-01	0.0143	0	na	2
MW-38A	2,4-Dimethylphenol	49	0.08940		0.06820	0.07590	0.05910		0.47000		31	Jul-01	2.8	0	na	31
MW-38A	1-Methyl naphthalene	3.1	0.1480		0.1730	0.1740	0.1610		0.2050		31	Jul-01	0.205	0	na	27
MW-38A	2-Methyl naphthalene	9.8	<0.0013		<0.0049	<0.000061	<0.00032		0.0010		31	Jul-01	0.2	0	na	13
MW-38A	Carbon disulfide	240	<0.010		<0.025	<0.00027	<0.0014		<0.0014		31	Jul-01	0.0013	0	na	5
MW-38A	Napthalene	49	0.0295		0.0296	0.0197	0.0203		0.0216		31	Jul-01	0.222	0	na	25
MW-38A	Pentachlorophenol	0.1	0.0022		<0.024	0.0013	0.0075		0.0063		31	Jul-01	0.037	0	na	11
MW-38A	Phenol	730	<0.0011		<0.0049	<0.000028	<0.0004		0.0039		31	Jul-01	0.0039	0	na	1
MW-38A	Pyridine	2.4	<0.0011		0.0026	<0.0011	<0.0037		<0.011		31	Jul-01	0.0026	0	na	1
MW-38A	Arsenic	1	0.0507		0.0458	0.0479	0.0742		0.0818		23	Jul-01	0.101	0	na	22
MW-38A	Beryllium	0.4	<0.0005		<0.001	<0.005	<0.0038		<0.0038		31	Jul-01	0.00012	0	na	1
MW-38A	Nickel	49	0.0403		0.0338	0.0335	0.0372		0.0482		31	Jul-01	0.0896	0	na	28
MW-38A	Selenium	5	<0.00097		<0.005	<0.005	0.014		<0.014		31	Jul-01	0.014	0	na	5
MW-38A	Vanadium	4.4	0.0024		0.0018	0.002	0.0046		0.0069		31	Jul-01	0.0238	0	na	12

Table XI.C.1.a.(1)(h)

HISTORICAL ANALYTICAL RESULTS - SITE E

Well	Constit.	GWPS mg/L	OCT-87	FEB-88	JUN-88	SEP-88	JAN-89	APR-89	JUL-89	OCT-89	JAN-90	APR-90	JUL-90	OCT-90	JAN-91	APR-91	JUL-91	OCT-91	JAN-92
MW-39	Acetone	2200																	
MW-39	Benzene	0.5	0.270	0.280	0.320	0.250	0.226	0.415	0.789	0.463	0.318	0.772	0.812	0.292	0.520	0.595	0.478	0.860	0.197
MW-39	Ethylbenzene	70																	
MW-39	Methyl Ethyl Ketone	1500																	
MW-39	Toluene	100																	
MW-39	Xylenes	1000																	
MW-39	Benzenethiol	0.24																	
MW-39	Cresols, totals	120																	
MW-39	Diethyl phthalate	2000																	
MW-39	2,4-Dimethylphenol	49																	
MW-39	1-Methyl naphthalene	3.1																	
MW-39	2-Methyl naphthalene	9.8																	
MW-39	Carbon disulfide	240																	
MW-39	Napthalene	49																	
MW-39	Pentachlorophenol	0.1																	
MW-39	Phenol	730																	
MW-39	Pyridine	2.4																	
MW-39	Arsenic	1																	
MW-39	Beryllium	0.4																	
MW-39	Nickel	49																	
MW-39	Selenium	5																	
MW-39	Vanadium	4.4																	
MW-39A	Acetone	2200																	
MW-39A	Benzene	0.5	0.004	<0.005	0.005	0.008	0.012	0.018	<0.1	0.011	0.014	0.012	0.025	0.094	0.59	0.480	0.456	0.580	0.758
MW-39A	Ethylbenzene	70																	
MW-39A	Methyl Ethyl Ketone	1500																	
MW-39A	Toluene	100																	
MW-39A	Xylenes	1000																	
MW-39A	Benzenethiol	0.24																	
MW-39A	Cresols, totals	120																	
MW-39A	Diethyl phthalate	2000																	
MW-39A	2,4-Dimethylphenol	49																	
MW-39A	1-Methyl naphthalene	3.1																	
MW-39A	2-Methyl naphthalene	9.8																	
MW-39A	Carbon disulfide	240																	
MW-39A	Napthalene	49																	
MW-39A	Pentachlorophenol	0.1																	
MW-39A	Phenol	730																	
MW-39A	Pyridine	2.4																	
MW-39A	Arsenic	1																	
MW-39A	Beryllium	0.4																	
MW-39A	Nickel	49																	
MW-39A	Selenium	5																	
MW-39A	Vanadium	4.4																	

Table XI.C.1.a.(1)(h)

HISTORICAL ANALYTICAL RESULTS - SITE E

Well	Constit.	GWPS mg/L	APR-92	JUL-92	OCT-92	JAN-93	MAR-93	JUL-93	OCT-93	FEB-94	APR-94	JUL-94	OCT-94	JAN-95	APR-95	JUL-95	OCT-95	JAN-96	JUL-96
MW-39	Acetone	2200																	
MW-39	Benzene	0.5	0.140	0.680	0.670	0.850	0.690	0.650	0.730	0.450	0.580	0.770	0.610	0.532	0.540	0.400	0.051	0.350	0.521
MW-39	Ethylbenzene	70																	
MW-39	Methyl Ethyl Ketone	1500																	
MW-39	Toluene	100																	
MW-39	Xylenes	1000																	
MW-39	Benzenethiol	0.24																	
MW-39	Cresols, totals	120																	
MW-39	Diethyl phthalate	2000																	
MW-39	2,4-Dimethylphenol	49																	
MW-39	1-Methyl naphthalene	3.1																	
MW-39	2-Methyl naphthalene	9.8																	
MW-39	Carbon disulfide	240																	
MW-39	Napthalene	49																	
MW-39	Pentachlorophenol	0.1																	
MW-39	Phenol	730																	
MW-39	Pyridine	2.4																	
MW-39	Arsenic	1																	
MW-39	Beryllium	0.4																	
MW-39	Nickel	49																	
MW-39	Selenium	5																	
MW-39	Vanadium	4.4																	
MW-39A	Acetone	2200																	
MW-39A	Benzene	0.5	0.650	0.660	0.820	0.730	0.700	0.760	0.7700	0.650	0.510	0.730	0.620	0.413	0.320	0.620	0.200	0.290	0.195
MW-39A	Ethylbenzene	70																	
MW-39A	Methyl Ethyl Ketone	1500																	
MW-39A	Toluene	100																	
MW-39A	Xylenes	1000																	
MW-39A	Benzenethiol	0.24																	
MW-39A	Cresols, totals	120																	
MW-39A	Diethyl phthalate	2000																	
MW-39A	2,4-Dimethylphenol	49																	
MW-39A	1-Methyl naphthalene	3.1																	
MW-39A	2-Methyl naphthalene	9.8																	
MW-39A	Carbon disulfide	240																	
MW-39A	Napthalene	49																	
MW-39A	Pentachlorophenol	0.1																	
MW-39A	Phenol	730																	
MW-39A	Pyridine	2.4																	
MW-39A	Arsenic	1																	
MW-39A	Beryllium	0.4																	
MW-39A	Nickel	49																	
MW-39A	Selenium	5																	
MW-39A	Vanadium	4.4																	

Table XI.C.1.a.(1)(h)

HISTORICAL ANALYTICAL RESULTS - SITE E

Well	Constit.	GWPS mg/L	JAN-97	JUL-97	JAN-98	JUL-98	Jan-99	Jan-00	Jul-00	Jan-01	Jul-01	Jan-02	Jul-02	Jan-03	Jul-03	Jan-04	Jul-04	Jan-05
MW-39	Acetone	2200									<0.1	<0.1	<0.1	0.160	0.120	<0.1	<0.1	<0.1
MW-39	Benzene	0.5	0.410	0.410	0.550	0.360		0.180	0.190	0.170	0.190	0.270	0.290	0.290	0.170	0.280	0.240	0.310
MW-39	Ethylbenzene	70	0.210	0.150	0.320	0.250	0.130			0.220	0.230	0.280	0.400	0.330	0.160	0.380	0.270	0.400
MW-39	Methyl Ethyl Ketone	1500									<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
MW-39	Toluene	100	1.000	0.660	1.000	0.700	0.500			0.300	0.300	0.360	0.400	0.320	0.170	0.300	0.210	0.300
MW-39	Xylenes	1000	0.3000	0.1700	0.3300	0.2500	0.1400			0.5250	0.2490	0.3700	0.4300	0.3200	0.2380	0.3900	0.3500	0.3700
MW-39	Benzenethiol	0.24	0.3600	0.1800	<0.50	<0.28	<0.25				<0.0025	<1.2	<2.5	<2.5	<1	<1	<1	<1
MW-39	Cresols, totals	120									1.900	1.700	1.400	0.730	2.240	0.460	0.940	0.570
MW-39	Diethyl phthalate	2000									<0.1	<0.05	<0.1	<0.1	<0.04	<0.04	<0.1	<0.1
MW-39	2,4-Dimethylphenol	49									3.00000	3.60000	5.60000	2.50000	2.80000	1.10000	2.20000	2.90000
MW-39	1-Methyl naphthalene	3.1									<0.1	<0.05	<0.1	0.0120	<0.04	<0.04	<0.1	<0.1
MW-39	2-Methyl naphthalene	9.8									<0.1	<0.05	<0.1	<0.01	<0.04	<0.04	<0.1	<0.1
MW-39	Carbon disulfide	240									<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
MW-39	Napthalene	49									0.035	0.075	<0.1	0.038	<0.04	0.056	<0.1	<0.1
MW-39	Pentachlorophenol	0.1									<0.05	0.027	<0.05	<0.05	0.026	<0.02	<0.05	<0.05
MW-39	Phenol	730									<0.1	<0.05	<0.1	<0.1	<0.04	<0.04	<0.1	<0.1
MW-39	Pyridine	2.4									<0.1	<0.05	<0.1	<0.1	<0.04	<0.04	<0.1	<0.1
MW-39	Arsenic	1									0.0639	0.091	0.08	0.0811	0.0725	0.0834	0.0774	0.0752
MW-39	Beryllium	0.4									<0.003	<0.003	<0.003	<0.005	<0.003	<0.005	<0.005	<0.005
MW-39	Nickel	49									0.066	0.053	0.053	<0.05	0.067	<0.05	<0.05	<0.05
MW-39	Selenium	5									<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW-39	Vanadium	4.4									<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
MW-39A	Acetone	2200									<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
MW-39A	Benzene	0.5	0.180	0.220	0.270	0.250		0.210	0.220	0.280	0.270	0.370	0.340	0.340	0.240	0.340	0.310	0.270
MW-39A	Ethylbenzene	70	0.081	0.082	0.095	0.082				0.130	0.120	0.120	0.140	0.130	0.120	0.130	0.120	0.120
MW-39A	Methyl Ethyl Ketone	1500									<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
MW-39A	Toluene	100	0.150	0.200	0.120	0.240				0.250	0.190	0.240	0.300	0.260	0.180	0.300	0.260	0.270
MW-39A	Xylenes	1000	0.0740	0.0600	0.0860	0.0770				0.1510	0.1400	0.1470	0.1650	0.1530	0.1400	0.1470	0.1430	0.1330
MW-39A	Benzenethiol	0.24	0.2300	0.0450	<0.50	<0.250					<0.0025	0.0440	<2.5	<2.5	<1	<1	<1	<1
MW-39A	Cresols, totals	120									0.590	<1	<2	0.306	0.990	0.140	0.290	0.220
MW-39A	Diethyl phthalate	2000									<0.1	<0.05	<0.1	<0.1	<0.04	<0.04	<0.04	<0.1
MW-39A	2,4-Dimethylphenol	49									7.00000	3.60000	6.20000	4.20000	9.20000	2.90000	5.90000	4.00000
MW-39A	1-Methyl naphthalene	3.1									<0.1	<0.05	<0.1	0.0210	<0.04	<0.04	<0.1	<0.1
MW-39A	2-Methyl naphthalene	9.8									0.0250	<0.05	<0.1	<0.1	<0.04	<0.04	<0.04	<0.1
MW-39A	Carbon disulfide	240									<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
MW-39A	Napthalene	49									0.096	0.070	0.110	0.072	<0.04	<0.04	0.17	0.18
MW-39A	Pentachlorophenol	0.1									<0.05	0.031	<0.05	<0.05	0.04	0.04	0.04	<0.05
MW-39A	Phenol	730									<0.1	<0.05	<0.1	<0.1	<0.04	<0.04	<0.04	<0.1
MW-39A	Pyridine	2.4									<0.1	<0.05	<0.1	<0.1	<0.04	<0.04	<0.04	<0.1
MW-39A	Arsenic	1									0.0964	0.151	0.1	0.11	0.114	0.107	0.0996	0.0836
MW-39A	Beryllium	0.4									<0.003	<0.003	<0.003	<0.005	<0.003	<0.003	<0.003	<0.003
MW-39A	Nickel	49									<0.05	<0.05	0.056	<0.05	<0.05	<0.05	<0.05	<0.05
MW-39A	Selenium	5									0.096	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW-39A	Vanadium	4.4									<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08

Table XI.C.1.a.(1)(h)

HISTORICAL ANALYTICAL RESULTS - SITE E

Well	Constit.	GWPS mg/L	Apr-05	Jul-05	Jan-06	Jul-06	Jan-07	Jul-07	Jan-08	Jul-08	Jan-09	Jul-09	Jan-10	Jul-10	Jan-11	Jul-11	Jan-12
MW-39	Acetone	2200		<0.1	<0.1	<0.1	<0.01	<0.1	<0.1	<0.1	<0.5	<0.1	<0.5	<0.012	<0.1	0.0194	<0.01
MW-39	Benzene	0.5		0.350	0.370	0.350	0.260	0.38	0.240	0.380	0.390	0.380	0.340	0.370	0.280	0.288	0.26
MW-39	Ethylbenzene	70	0.350	0.440	0.38		0.4	0.43	0.24	0.3	0.410	0.32	0.290	0.39	0.3	0.169	0.252
MW-39	Methyl Ethyl Ketone	1500		<0.1	<0.1	<0.1	<0.01	<0.1	<0.1	<0.1	<0.5	<0.1	<0.5	<0.012	<0.1	0.0020	<0.0018
MW-39	Toluene	100	0.230	0.240	0.24		0.28	0.27	0.3	0.29	0.250	0.23	0.190	0.26	0.16	0.132	0.203
MW-39	Xylenes	1000	0.3900	0.4200	0.3800		0.3600	0.4700	0.2300	0.3100	0.4100	0.3300	0.2640	0.3100	0.2220	0.2050	0.2410
MW-39	Benzenethiol	0.24	<0.5	<0.5	<0.25		<0.5	<0.5		<0.25	<0.25						
MW-39	Cresols, totals	120		0.610	0.430	0.410	0.210	0.420	0.470	0.280	0.430	0.229	0.319	0.373	0.294	0.0635	0.021
MW-39	Diethyl phthalate	2000		<0.1	<0.1	<0.05	<0.1	<0.1	<0.05	<0.05	<0.05	<0.04	<0.053	<0.051	<0.025	<0.022	<0.0022
MW-39	2,4-Dimethylphenol	49		1.40000	1.30000	0.61000	2.00000	2.10000	1.00000	2.60000	3.30000	1.90000	3.20000	2.60000	1.90000	2.65000	1.97000
MW-39	1-Methyl naphthalene	3.1		<0.1	<0.1	<0.05	<0.1	<0.1	<0.05	<0.05	<0.05	<0.04	<0.053	<0.051	<0.025	<0.022	0.0195
MW-39	2-Methyl naphthalene	9.8		<0.1	<0.1	<0.05	<0.1	<0.1	<0.05	<0.05	<0.05	<0.04	<0.053	<0.051	<0.025	<0.026	0.0148
MW-39	Carbon disulfide	240		<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.025	<0.005	<0.025	<0.005	<0.005	0.0016	0.0025
MW-39	Napthalene	49		<0.1	<0.1	0.054	<0.1	<0.1	<0.05	0.084	0.22	0.1	0.21	0.23	0.31	0.0752	0.147
MW-39	Pentachlorophenol	0.1		<0.05	<0.05	0.025	<0.05	<0.05	<0.025	0.0028	<0.025	<0.02	0.035	<0.25	<0.1	0.0445	0.0308
MW-39	Phenol	730		<0.1	<0.1	<0.05	<0.1	<0.01	<0.05	<0.05	<0.05	<0.04	<0.053	<0.051	<0.025	<0.015	<0.0015
MW-39	Pyridine	2.4		<0.1	<0.1	<0.05	<0.1	<0.1	<0.05	<0.05	<0.05	<0.04	<0.053	<0.051	<0.025	<0.02	<0.0020
MW-39	Arsenic	1		0.0721	0.0712	<0.1	0.0658	0.0454		0.063	0.0778						
MW-39	Beryllium	0.4		<0.003	<0.003	<0.003	<0.003	<0.003	<0.004	<0.004	<0.004	<0.004	<0.02	<0.004	<0.04	0.000049	<0.00011
MW-39	Nickel	49	0.0526	<0.05	<0.05	<0.05	0.0552	0.0467	0.0477	0.0521	0.0413		0.057	0.0488	0.0621	0.0336	0.0405
MW-39	Selenium	5		<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.1	<0.005	<0.2	0.00093	<0.00083
MW-39	Vanadium	4.4		<0.08	<0.08	<0.08	<0.08	<0.08	0.00853	<0.005	0.019	<0.005	<0.025	<0.005	<0.05	0.0097	0.0062
MW-39A	Acetone	2200		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.5	<0.1	<0.1	<0.012	<0.1	0.0183	<0.01
MW-39A	Benzene	0.5		0.290	0.290	0.320	0.250	0.31	0.170	0.310	0.310	0.250	0.220	0.270	0.290	0.326	0.241
MW-39A	Ethylbenzene	70	0.120	0.140	0.21		0.16	0.22	0.1	0.18	0.220	0.12	0.140	0.17	0.16	0.32	0.174
MW-39A	Methyl Ethyl Ketone	1500		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.5	<0.1	<0.1	0.023	<0.1	0.0028	<0.0018
MW-39A	Toluene	100	0.200	0.200	0.18		0.3	0.34	0.11	0.19	0.230	0.098	0.100	0.11	0.16	0.226	0.13
MW-39A	Xylenes	1000	0.1280	0.1460	0.2280		0.1570	0.2460	0.0940	0.3600	0.2240	0.1150	0.1340	0.1510	0.1610	0.3050	0.1630
MW-39A	Benzenethiol	0.24	<0.5	<0.5	<0.25		<0.5	<0.5		<0.5	<0.25						
MW-39A	Cresols, totals	120		0.190	0.300	0.580	0.930	0.450	0.277	0.160	0.219	0.105	0.100	0.100	0.077	0.1490	0.028
MW-39A	Diethyl phthalate	2000		<0.1	<0.1	<0.05	<0.1	<0.1	<0.05	<0.1	<0.05	<0.04	<0.056	<0.05	<0.02	<0.022	<0.0023
MW-39A	2,4-Dimethylphenol	49		1.80000	2.80000	3.20000	4.70000	2.90000	0.38000	2.70000	3.30000	1.40000	2.20000	2.00000	3.60000	2.59000	2.12000
MW-39A	1-Methyl naphthalene	3.1		<0.1	<0.1	<0.05	<0.1	<0.1	<0.05	<0.1	<0.05	<0.04	<0.056	<0.05	<0.02	0.0325	0.0058
MW-39A	2-Methyl naphthalene	9.8		<0.1	<0.1	<0.05	<0.1	<0.1	<0.05	<0.1	<0.05	<0.04	<0.056	<0.05	<0.02	<0.026	0.0054
MW-39A	Carbon disulfide	240		<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.025	<0.005	<0.005	<0.005	<0.005	<0.00036	0.003
MW-39A	Napthalene	49		<0.1	0.1	0.079	<0.1	<0.1	0.084	<0.1	0.07	0.052	0.085	0.098	0.099	0.326	0.07
MW-39A	Pentachlorophenol	0.1		<0.05	<0.05	0.03	<0.05	<0.05	<0.025	0.053	0.029	<0.02	0.031	<0.25	<0.1	0.0418	0.0329
MW-39A	Phenol	730		<0.1	<0.1	<0.05	<0.1	<0.01	<0.05	<0.1	<0.05	<0.04	<0.056	<0.05	<0.02	<0.015	<0.0016
MW-39A	Pyridine	2.4		<0.1	<0.1	<0.05	<0.1	<0.1	<0.05	<0.1	<0.05	<0.04	<0.056	<0.05	<0.02	<0.02	<0.0021
MW-39A	Arsenic	1		0.084	0.0973	0.122	0.0983	0.0522		0.0595	0.0972						
MW-39A	Beryllium	0.4		<0.003	<0.003	<0.003	<0.003	<0.003	<0.004	<0.004	<0.004	<0.004	<0.02	<0.004	<0.04	0.000042	<0.00011
MW-39A	Nickel	49	<0.05	<0.05	0.054	<0.05	<0.05	0.0286	0.04	0.0592	0.0327		0.044	0.0369	0.0583	0.0376	0.0343
MW-39A	Selenium	5		<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	0.0243	<0.02	<0.1	<0.005	<0.2	0.00077	<0.00083
MW-39A	Vanadium	4.4		<0.08	<0.08	<0.08	<0.08	<0.08	0.00837	0.00676	0.0312	0.00657	<0.025	0.0057	<0.05	0.0058	<0.01

Table XI.C.1.a.(1)(h)

HISTORICAL ANALYTICAL RESULTS - SITE E

Well	Constit.	GWPS mg/L	Jul-12	Jan-13	Jul-13	Jan-14	Jul-14	Mar-15	Jul-15	Jan-16	Jul-16	Jan-17	Jul-17	Jan-18	Jul-18	Jan-19	Jul-19	Jan-20	Jul-20
MW-39	Acetone	2200	0.0198	<0.010	0.0261	0.0139													
MW-39	Benzene	0.5	0.185	0.182	0.235	0.271	0.297	0.372	0.264	0.327	0.266	0.326	0.391	0.278	0.349	0.394	0.289	0.262	0.26
MW-39	Ethylbenzene	70	0.177	0.104	0.192	0.237	0.261	0.323	0.172	0.188	0.133	0.173	0.173	0.142	0.114	0.166	0.121	0.138	0.148
MW-39	Methyl Ethyl Ketone	1500	0.005	0.006	0.0065	<0.0027													
MW-39	Toluene	100	0.153	0.0993	0.119	0.166	0.161	0.188	0.188	0.12	0.1270	0.0828	0.1170	0.0911	0.0630	0.1070	0.0737	0.0674	0.0644
MW-39	Xylenes	1000	0.1650	0.0975	0.1860	0.1850	0.2020	0.2740	0.2740	0.1300	0.1430	0.0911	0.1400	0.0911	0.0630	0.1240	0.0857	0.0962	0.0944
MW-39	Benzenethiol	0.24		0.0938	0.1270	0.0453	0.0693	0.0869	0.0996	0.0525	0.0810	0.0810	0.8490	0.0629	0.0575	0.0502	0.0708	0.0584	0.0683
MW-39	Cresols, totals	120	0.021	0.012	0.0886	0.1033													
MW-39	Diethyl phthalate	2000	<0.0043	<0.0061	<0.0061	<0.0056													
MW-39	2,4-Dimethylphenol	49	2.18000	1.36000	2.29000	0.83800													
MW-39	1-Methyl naphthalene	3.1	0.0122	0.0334	0.0145	0.0313													
MW-39	2-Methyl naphthalene	9.8	0.0084	0.0253	0.0118	0.0252													
MW-39	Carbon disulfide	240	0.0013	0.0009	0.0017	0.0016													
MW-39	Napthalene	49	0.0793	0.185	0.109	0.16													
MW-39	Pentachlorophenol	0.1	0.0221	0.0123	0.0216	0.007													
MW-39	Phenol	730	<0.003	<0.0059	<0.0059	<0.0059													
MW-39	Pyridine	2.4	<0.004	<0.017	<0.017	<0.0051													
MW-39	Arsenic	1		0.0540	0.0925	0.0502													
MW-39	Beryllium	0.4	<0.00064	<0.00064	<0.00064	<0.00064													
MW-39	Nickel	49	0.046	0.0468	0.0392	0.0464													
MW-39	Selenium	5	0.0031	<0.0014	0.0028	0.0037													
MW-39	Vanadium	4.4	0.0056	0.0059	0.0095	0.0054													
MW-39A	Acetone	2200	<0.01	<0.010	0.0323	0.0142													
MW-39A	Benzene	0.5	0.236	0.208	0.296	0.252	0.304	0.328	0.111	0.124	0.137	0.137	0.138	0.119	0.159	0.145	0.148	0.14	0.165
MW-39A	Ethylbenzene	70	0.134	0.145	0.305	0.171	0.191	0.181	0.0748	0.0935	0.0939	0.103	0.103	0.0887	0.105	0.124	0.14	0.123	0.139
MW-39A	Methyl Ethyl Ketone	1500	<0.0018	0.005	0.0082	0.0033													
MW-39A	Toluene	100	0.106	0.112	0.201	0.12	0.129	0.116	0.116	0.0377	0.0454	0.0484	0.0518	0.0451	0.0552	0.0584	0.0596	0.0631	0.0526
MW-39A	Xylenes	1000	0.1270	0.1450	0.3090	0.1750	0.2030	0.1770	0.1770	0.0709	0.0863	0.0815	0.0979	0.0451	0.0552	0.1100	0.1160	0.1050	0.0956
MW-39A	Benzenethiol	0.24		0.1260	0.1360	0.0898	0.0769	0.0800	0.0821	0.1010	0.0447	0.0492	0.0492	0.0759	0.0734	0.0608	0.0778	0.0682	0.0268
MW-39A	Cresols, totals	120	0.087	0.016	0.134	0.0779													
MW-39A	Diethyl phthalate	2000	<0.0043	<0.0061	<0.0061	<0.0063													
MW-39A	2,4-Dimethylphenol	49	2.79000	1.81000	1.70000	0.78200													
MW-39A	1-Methyl naphthalene	3.1	0.1610	0.0123	0.0472	0.0145													
MW-39A	2-Methyl naphthalene	9.8	<0.0052	0.0088	0.0395	0.0116													
MW-39A	Carbon disulfide	240	0.001	0.001	0.0019	0.0022													
MW-39A	Napthalene	49	0.0838	0.0876	0.252	0.0744													
MW-39A	Pentachlorophenol	0.1	0.0193	0.0138	0.014	0.0147													
MW-39A	Phenol	730	<0.0030	<0.0059	<0.0059	<0.0067													
MW-39A	Pyridine	2.4	<0.0040	<0.017	<0.017	<0.0058													
MW-39A	Arsenic	1		0.0859	0.0585	0.0867													
MW-39A	Beryllium	0.4	<0.00064	<0.00064	<0.00064	<0.00064													
MW-39A	Nickel	49	0.0354	0.037	0.045	0.0388													
MW-39A	Selenium	5	0.0037	0.0016	0.0017	0.0049													
MW-39A	Vanadium	4.4	0.0093	0.0099	0.0059	0.0088													

Table XI.C.1.a.(1)(h)

HISTORICAL ANALYTICAL RESULTS - SITE E

Well	Constit.	GWPS mg/L	Jan-21	Jul-21	Jan-22	Jul-22	Jan-23	Jul-23	Jan-24	Jul-24	# Data	Date First Analysis	Max. Value (mg/L)	# Data >GWPS	Date Last >GWPS	# Data >MDL
MW-39	Acetone	2200	<0.10		<0.500	0.0234	0.0226		<0.0011		31	Jul-01	0.16	0	na	8
MW-39	Benzene	0.5	0.217	0.1750	0.0965	0.1530	0.0887	0.0613	0.1020	0.0549	88	Oct-87	0.86	19	Jan-98	87
MW-39	Ethylbenzene	70	0.138	0.121	0.12	0.185	0.137	0.102	0.137	0.0839	53	Jan-97	0.44	0	na	53
MW-39	Methyl Ethyl Ketone	1500	<0.017		<0.100	0.0043	<0.00078		<0.00078		31	Jul-01	0.0065	0	na	5
MW-39	Toluene	100	0.0478	0.0403	0.0306	0.0570	0.0428	0.0421	0.0357	0.0220	53	Jan-97	1	0	na	53
MW-39	Xylenes	1000	0.0823	0.0833	0.0670	0.1050	0.0777	0.0616	0.0872	0.0511	53	Jan-97	0.525	0	na	53
MW-39	Benzenethiol	0.24	0.0882	0.5010	0.0921	0.0614	0.0341	0.3450	0.0349	0.0546	44	Jan-97	0.849	4	Jul-23	26
MW-39	Cresols, totals	120	0.0184		0.0125	<0.000027	0.0022		0.0098		31	Jul-01	2.24	0	na	30
MW-39	Diethyl phthalate	2000	<0.001		<0.0049	<0.000072	<0.00046		<0.00074		31	Jul-01	0	0	na	0
MW-39	2,4-Dimethylphenol	49	0.29000		0.20300	0.30500	0.05310		0.15400		31	Jul-01	5.6	0	na	31
MW-39	1-Methyl naphthalene	3.1	0.0393		0.0434	0.0202	0.0443		0.0119		31	Jul-01	0.0443	0	na	11
MW-39	2-Methyl naphthalene	9.8	0.0027		0.0326	0.0137	<0.00032		0.0084		31	Jul-01	0.0326	0	na	9
MW-39	Carbon disulfide	240	<0.010		<0.050	<0.00027	0.00062		<0.00027		31	Jul-01	0.0025	0	na	7
MW-39	Napthalene	49	<0.0011		0.404	0.449	<0.00027		0.5300		31	Jul-01	0.53	0	na	20
MW-39	Pentachlorophenol	0.1	0.0046		0.0022	0.0028	<0.0047		0.0012		31	Jul-01	0.0445	0	na	15
MW-39	Phenol	730	0.0016		<0.0049	<0.000027	<0.0004		0.0015		31	Jul-01	0.0016	0	na	2
MW-39	Pyridine	2.4	<0.001		<0.0049	<0.0010	<0.0037		<0.011		31	Jul-01	0	0	na	0
MW-39	Arsenic	1	0.037		0.0531	0.0472	0.228		0.154		23	Jul-01	0.228	0	na	21
MW-39	Beryllium	0.4	<0.0005		<0.001	<0.001	<0.0038		<0.0038		31	Jul-01	0.000049	0	na	1
MW-39	Nickel	49	0.0295		0.0191	0.0222	0.0128		0.0214		31	Jul-01	0.0668	0	na	24
MW-39	Selenium	5	0.00081		<0.005	<0.005	<0.014		<0.014		31	Jul-01	0.0037	0	na	5
MW-39	Vanadium	4.4	0.0212		0.0224	0.0194	0.0168		0.0209		31	Jul-01	0.0224	0	na	13
MW-39A	Acetone	2200	<0.10		0.0149	<0.0011	0.0123		0.0229		31	Jul-01	0.0323	0	na	6
MW-39A	Benzene	0.5	0.154	0.1740	0.167	0.1550	0.1600	0.1370	0.1520	0.1700	88	Oct-87	0.82	14	Jul-95	84
MW-39A	Ethylbenzene	70	0.104	0.103	0.101	0.0979	0.0992	0.0739	0.0886	0.108	52	Jan-97	0.32	0	na	52
MW-39A	Methyl Ethyl Ketone	1500	<0.017		0.0229	0.018	0.0152		0.0128		31	Jul-01	0.023	0	na	9
MW-39A	Toluene	100	0.0474	0.0443	0.0386	0.0331	0.0355	0.0316	0.0382	0.0437	52	Jan-97	0.34	0	na	52
MW-39A	Xylenes	1000	0.0660	0.0734	0.0572	0.0530	0.0542	0.0420	0.0515	0.0638	52	Jan-97	0.36	0	na	52
MW-39A	Benzenethiol	0.24	0.0290	0.0606	0.0597	0.0375	0.0150	0.0368	0.0335	0.0462	43	Jan-97	0.23	0	na	27
MW-39A	Cresols, totals	120	0.0698		0.0431	0.0684	0.0514		0.0586		31	Jul-01	0.99	0	na	29
MW-39A	Diethyl phthalate	2000	<0.001		<0.0049	0.0088	<0.00046		0.0024		31	Jul-01	0.0088	0	na	2
MW-39A	2,4-Dimethylphenol	49	0.29400		0.08560	0.10800	0.10700		0.21500		31	Jul-01	9.2	0	na	31
MW-39A	1-Methyl naphthalene	3.1	0.0280		0.0306	0.0278	0.0225		0.0303		31	Jul-01	0.161	0	na	12
MW-39A	2-Methyl naphthalene	9.8	0.0255		0.0279	0.0266	0.0208		0.0286		31	Jul-01	0.0395	0	na	10
MW-39A	Carbon disulfide	240	<0.010		<0.005	<0.00027	0.0012		<0.00027		31	Jul-01	0.0025	0	na	6
MW-39A	Napthalene	49	0.0941		0.0719	0.0846	0.0883		0.1110		31	Jul-01	0.326	0	na	25
MW-39A	Pentachlorophenol	0.1	0.0035		<0.024	0.0018	<0.0047		0.0011		31	Jul-01	0.053	0	na	17
MW-39A	Phenol	730	<0.0011		<0.0049	<0.000028	<0.0004		<0.00027		31	Jul-01	0	0	na	0
MW-39A	Pyridine	2.4	<0.0011		<0.0049	<0.0011	<0.0037		<0.011		31	Jul-01	0	0	na	0
MW-39A	Arsenic	1	0.057		0.0715	0.079	0.0853		0.101		23	Jul-01	0.151	0	na	22
MW-39A	Beryllium	0.4	<0.002		<0.001	<0.005	<0.015		<0.0038		31	Jul-01	0.000042	0	na	1
MW-39A	Nickel	49	0.0232		0.0293	0.0278	0.0327		0.0304		31	Jul-01	0.0592	0	na	20
MW-39A	Selenium	5	0.0014		<0.050	<0.005	<0.056		<0.014		31	Jul-01	0.0964	0	na	8
MW-39A	Vanadium	4.4	0.0019		<0.010	<0.005	<0.0072		0.0025		31	Jul-01	0.0312	0	na	12

Table XI.C.1.a.(1)(h)

HISTORICAL ANALYTICAL RESULTS - SITE E

Well	Constit.	GWPS mg/L	OCT-87	FEB-88	JUN-88	SEP-88	JAN-89	APR-89	JUL-89	OCT-89	JAN-90	APR-90	JUL-90	OCT-90	JAN-91	APR-91	JUL-91	OCT-91	JAN-92
MW-40	Acetone	2200																	
MW-40	Benzene	0.5	0.430	0.310	0.420	0.250	0.545	0.327	0.794	0.452	0.504	0.587	0.155	0.476	0.340	0.410	0.400	0.430	0.478
MW-40	Ethylbenzene	70																	
MW-40	Methyl Ethyl Ketone	1500																	
MW-40	Toluene	100																	
MW-40	Xylenes	1000																	
MW-40	Benzenethiol	0.24																	
MW-40	Cresols, totals	120																	
MW-40	Diethyl phthalate	2000																	
MW-40	2,4-Dimethylphenol	49																	
MW-40	1-Methyl naphthalene	3.1																	
MW-40	2-Methyl naphthalene	9.8																	
MW-40	Carbon disulfide	240																	
MW-40	Napthalene	49																	
MW-40	Pentachlorophenol	0.1																	
MW-40	Phenol	730																	
MW-40	Pyridine	2.4																	
MW-40	Arsenic	1																	
MW-40	Beryllium	0.4																	
MW-40	Nickel	49																	
MW-40	Selenium	5																	
MW-40	Vanadium	4.4																	
MW-40A	Acetone	2200																	
MW-40A	Benzene	0.5	0.460	<0.005	0.150	0.180	0.146	0.270	0.502	0.299	0.456	0.451	0.707	0.750	0.360	0.366	0.289	0.420	0.357
MW-40A	Ethylbenzene	70																	
MW-40A	Methyl Ethyl Ketone	1500																	
MW-40A	Toluene	100																	
MW-40A	Xylenes	1000																	
MW-40A	Benzenethiol	0.24																	
MW-40A	Cresols, totals	120																	
MW-40A	Diethyl phthalate	2000																	
MW-40A	2,4-Dimethylphenol	49																	
MW-40A	1-Methyl naphthalene	3.1																	
MW-40A	2-Methyl naphthalene	9.8																	
MW-40A	Carbon disulfide	240																	
MW-40A	Napthalene	49																	
MW-40A	Pentachlorophenol	0.1																	
MW-40A	Phenol	730																	
MW-40A	Pyridine	2.4																	
MW-40A	Arsenic	1																	
MW-40A	Beryllium	0.4																	
MW-40A	Nickel	49																	
MW-40A	Selenium	5																	
MW-40A	Vanadium	4.4																	

Table XI.C.1.a.(1)(h)

HISTORICAL ANALYTICAL RESULTS - SITE E

Well	Constit.	GWPS mg/L	APR-92	JUL-92	OCT-92	JAN-93	MAR-93	JUL-93	OCT-93	FEB-94	APR-94	JUL-94	OCT-94	JAN-95	APR-95	JUL-95	OCT-95	JAN-96	JUL-96
MW-40	Acetone	2200																	
MW-40	Benzene	0.5	3.800	0.510	0.440	0.420	0.420	0.380	0.340	0.360	0.380	0.380	0.390	0.382	0.330	0.400	0.300	0.210	0.447
MW-40	Ethylbenzene	70																	
MW-40	Methyl Ethyl Ketone	1500																	
MW-40	Toluene	100																	
MW-40	Xylenes	1000																	
MW-40	Benzenethiol	0.24																	
MW-40	Cresols, totals	120																	
MW-40	Diethyl phthalate	2000																	
MW-40	2,4-Dimethylphenol	49																	
MW-40	1-Methyl naphthalene	3.1																	
MW-40	2-Methyl naphthalene	9.8																	
MW-40	Carbon disulfide	240																	
MW-40	Napthalene	49																	
MW-40	Pentachlorophenol	0.1																	
MW-40	Phenol	730																	
MW-40	Pyridine	2.4																	
MW-40	Arsenic	1																	
MW-40	Beryllium	0.4																	
MW-40	Nickel	49																	
MW-40	Selenium	5																	
MW-40	Vanadium	4.4																	
MW-40A	Acetone	2200																	
MW-40A	Benzene	0.5	0.940	0.880	0.930	0.890	0.410	0.760	0.890	0.800	0.320	0.640	0.300	0.385	0.330	0.400	2.300	0.170	0.322
MW-40A	Ethylbenzene	70																	
MW-40A	Methyl Ethyl Ketone	1500																	
MW-40A	Toluene	100																	
MW-40A	Xylenes	1000																	
MW-40A	Benzenethiol	0.24																	
MW-40A	Cresols, totals	120																	
MW-40A	Diethyl phthalate	2000																	
MW-40A	2,4-Dimethylphenol	49																	
MW-40A	1-Methyl naphthalene	3.1																	
MW-40A	2-Methyl naphthalene	9.8																	
MW-40A	Carbon disulfide	240																	
MW-40A	Napthalene	49																	
MW-40A	Pentachlorophenol	0.1																	
MW-40A	Phenol	730																	
MW-40A	Pyridine	2.4																	
MW-40A	Arsenic	1																	
MW-40A	Beryllium	0.4																	
MW-40A	Nickel	49																	
MW-40A	Selenium	5																	
MW-40A	Vanadium	4.4																	

Table XI.C.1.a.(1)(h)

HISTORICAL ANALYTICAL RESULTS - SITE E

Well	Constit.	GWPS mg/L	JAN-97	JUL-97	JAN-98	JUL-98	Jan-99	Jan-00	Jul-00	Jan-01	Jul-01	Jan-02	Jul-02	Jan-03	Jul-03	Jan-04	Jul-04	Jan-05
MW-40	Acetone	2200									<0.1	0.180	0.390	0.290	0.140	0.140	<0.1	0.160
MW-40	Benzene	0.5	0.390	0.430	0.530	0.490		0.510	0.520	0.440	0.490	0.550	0.560	0.650	0.450	0.560	0.500	0.430
MW-40	Ethylbenzene	70	0.160	0.130	0.180	0.140				0.160	0.160	0.180	0.160	0.230	0.140	0.180	0.140	0.190
MW-40	Methyl Ethyl Ketone	1500									<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
MW-40	Toluene	100	0.360	0.370	0.470	0.300				0.310	0.380	0.440	0.460	0.550	0.270	0.450	0.340	0.330
MW-40	Xylenes	1000	0.3300	0.2300	0.2800	0.2200				0.2370	0.2400	0.2700	0.2420	0.3000	0.2110	0.2580	0.2100	0.2700
MW-40	Benzenethiol	0.24	0.6400	0.3950	0.5900	<0.250					<0.0025	0.0690	<2.5	<2.5	<1	<1	<1	<1
MW-40	Cresols, totals	120									13.000	21.000	26.900	11.600	25.900	12.000	17.750	16.000
MW-40	Diethyl phthalate	2000									<0.1	<0.05	<0.1	<0.1	<0.04	<0.04	<0.1	<0.1
MW-40	2,4-Dimethylphenol	49									11.00000	9.10000	18.00000	6.90000	16.00000	5.50000	11.00000	12.00000
MW-40	1-Methyl naphthalene	3.1									<0.1	0.0530	<0.1	0.0240	<0.04	<0.04	<0.1	<0.1
MW-40	2-Methyl naphthalene	9.8									11.0000	0.0560	<0.1	<0.1	<0.04	<0.04	<0.1	<0.1
MW-40	Carbon disulfide	240									<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
MW-40	Napthalene	49									0.410	0.190	0.150	0.073	0.110	0.150	0.160	0.140
MW-40	Pentachlorophenol	0.1									0.072	0.076	0.097	0.028	0.097	0.042	<0.05	<0.05
MW-40	Phenol	730									0.038	<0.05	<0.1	<0.1	<0.04	<0.04	<0.1	<0.1
MW-40	Pyridine	2.4									<0.1	<0.05	<0.1	<0.1	<0.04	<0.04	<0.1	<0.1
MW-40	Arsenic	1									0.215	0.218	0.2	0.173	0.206	0.214	0.193	0.174
MW-40	Beryllium	0.4									<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
MW-40	Nickel	49									0.086	0.091	0.064	0.070	0.065	0.070	0.066	0.073
MW-40	Selenium	5									<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW-40	Vanadium	4.4									<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
MW-40A	Acetone	2200									<0.1	0.570	<0.1	0.340	0.490	0.170	0.110	<0.1
MW-40A	Benzene	0.5	0.240	0.280	0.280	0.240		0.360	0.600	0.480	0.280	0.500	0.470	0.400	0.360	0.350	0.370	0.290
MW-40A	Ethylbenzene	70	0.110	0.100	0.110	0.089				0.180	0.084	0.190	0.170	0.150	0.170	0.120	0.140	0.130
MW-40A	Methyl Ethyl Ketone	1500									<0.1	0.120	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
MW-40A	Toluene	100	0.310	0.350	0.390	0.310				0.950	0.360	0.820	0.740	0.530	0.500	0.510	0.480	0.340
MW-40A	Xylenes	1000	0.1400	0.1100	0.1100	0.0900				0.2030	0.0830	0.2170	0.2020	0.1690	0.2500	0.1390	0.1820	0.1490
MW-40A	Benzenethiol	0.24	0.6900	0.0240	<0.50	<0.250					<0.0025	0.0810	<2.5	<2.5	<1	2.2000	<1	<1
MW-40A	Cresols, totals	120									18.600	29.000	15.800	12.500	13.800	12.000	6.100	5.300
MW-40A	Diethyl phthalate	2000									<0.1	<0.1	<0.1	<0.1	<0.04	<0.04	<0.1	<0.1
MW-40A	2,4-Dimethylphenol	49									9.70000	11.00000	8.10000	5.80000	11.00000	15.00000	3.80000	7.10000
MW-40A	1-Methyl naphthalene	3.1									<0.1	<0.1	<0.1	0.0120	<0.04	<0.04	<0.1	<0.1
MW-40A	2-Methyl naphthalene	9.8									<0.1	<0.1	<0.1	<0.1	<0.04	<0.04	<0.1	<0.1
MW-40A	Carbon disulfide	240									0.005	0.005	0.006	0.011	0.006	0.009	0.010	0.010
MW-40A	Napthalene	49									0.057	<0.1	<0.1	0.028	0.054	0.054	<0.1	<0.1
MW-40A	Pentachlorophenol	0.1									0.048	0.073	0.050	0.016	0.054	0.025	<0.05	<0.05
MW-40A	Phenol	730									0.160	0.010	<0.1	<0.1	<0.04	<0.04	<0.1	<0.1
MW-40A	Pyridine	2.4									<0.1	0.010	<0.1	<0.1	<0.04	<0.04	<0.1	<0.1
MW-40A	Arsenic	1									0.131	0.161	0.2	0.152	0.18	0.169	0.16	0.151
MW-40A	Beryllium	0.4									<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
MW-40A	Nickel	49									<0.05	<0.05	<0.05	0.070	<0.05	<0.05	<0.05	<0.05
MW-40A	Selenium	5									<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW-40A	Vanadium	4.4									<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08

Table XI.C.1.a.(1)(h)

HISTORICAL ANALYTICAL RESULTS - SITE E

Well	Constit.	GWPS mg/L	Apr-05	Jul-05	Jan-06	Jul-06	Jan-07	Jul-07	Jan-08	Jul-08	Jan-09	Jul-09	Jan-10	Jul-10	Jan-11	Jul-11	Jan-12
MW-40	Acetone	2200		0.240	0.29	<0.1	<0.1	<0.1	<0.1	<0.1	<0.5	<0.1	<0.1	<0.012	<0.1	0.0224	<0.01
MW-40	Benzene	0.5		0.570	0.580	0.390	0.410	0.50	0.400	0.550	0.540	0.420	0.260	0.380	0.240	0.274	0.214
MW-40	Ethylbenzene	70	0.190	0.180	0.13		0.19	0.14	0.12	0.16	0.180	0.14	0.110	0.16	0.1	0.105	0.102
MW-40	Methyl Ethyl Ketone	1500		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.5	<0.1	<0.1	<0.012	<0.1	0.0021	<0.0018
MW-40	Toluene	100	0.430	0.520	0.21		0.5	0.36	0.33	0.37	0.370	0.25	0.140	0.21	0.12	0.141	0.112
MW-40	Xylenes	1000	0.2700	0.2670	0.1930		0.2700	0.1900	0.1760	0.3200	0.2700	0.2070	0.1580	0.2320	0.1490	0.1900	0.1400
MW-40	Benzenethiol	0.24	<0.5	<0.5	<0.25		<0.5	<0.5		<0.05	<0.25						
MW-40	Cresols, totals	120		19.680	10.170	14.730	25.910	32.560	27.600	17.660	16.540	12.380	4.750	1.100	0.550	0.2480	0.085
MW-40	Diethyl phthalate	2000		<0.1	<0.1	<0.5	<0.1	<0.1	<0.05	<0.05	<0.05	<0.04	<0.052	<0.054	<0.02	<0.022	<0.0022
MW-40	2,4-Dimethylphenol	49		12.00000	3.70000	5.90000	15.00000	20.00000	8.30000	14.00000	13.00000	7.20000	13.00000	8.80000	6.90000	4.20000	3.67000
MW-40	1-Methyl naphthalene	3.1		<0.1	<0.1	<0.05	<0.1	<0.1	<0.05	<0.05	<0.05	<0.04	<0.052	<0.054	0.0440	0.0567	0.0408
MW-40	2-Methyl naphthalene	9.8		<0.1	<0.1	<0.5	<0.1	<0.1	<0.05	<0.05	<0.05	<0.04	<0.052	<0.054	0.0280	<0.026	0.0118
MW-40	Carbon disulfide	240		<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.025	<0.005	<0.005	<0.005	<0.005	0.0009	0.0016
MW-40	Napthalene	49		0.150	<0.1	0.13	0.2	0.12	0.15	0.12	0.2	0.13	0.24	0.23	0.22	0.167	0.0953
MW-40	Pentachlorophenol	0.1		<0.05	0.068	0.055	0.067	<0.05	0.053	0.07	<0.025	0.056	0.076	<0.27	<0.1	0.0665	0.0443
MW-40	Phenol	730		<0.1	<0.1	<0.05	<0.1	<0.01	<0.05	<0.05	<0.05	<0.04	<0.052	<0.054	<0.02	<0.015	<0.0016
MW-40	Pyridine	2.4		<0.1	<0.1	<0.05	<0.1	<0.1	<0.05	<0.05	<0.05	<0.04	<0.052	<0.054	<0.02	<0.02	<0.0020
MW-40	Arsenic	1		0.198	0.214	0.169	0.138	0.133		0.145	0.156						
MW-40	Beryllium	0.4		<0.003	<0.003	<0.003	<0.003	<0.003	<0.004	<0.004	<0.004	<0.004	<0.02	<0.005	<0.04	0.000140	<.001
MW-40	Nickel	49	0.073	0.0692	0.0805	0.0754	0.0792	0.0874	0.0852	0.0898	0.0663		0.109	0.0896	0.101	0.0828	0.0752
MW-40	Selenium	5		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.0867	<0.1	<0.01	<0.2	0.00089	<.001
MW-40	Vanadium	4.4		<0.08	<0.08	<0.08	<0.08	<0.08	0.00712	<0.005	0.0284	0.00626	<0.025	<0.005	<0.05	0.0032	0.0032
MW-40A	Acetone	2200		<0.1	0.12	<0.1	<0.1	<0.1	<0.1	<0.1	<0.5	<0.1	<0.1	<0.012	<0.1	0.0199	<0.01
MW-40A	Benzene	0.5		0.320	0.270	0.280	0.230	0.24	0.210	0.270	0.260	0.280	0.280	0.370	0.270	0.297	0.378
MW-40A	Ethylbenzene	70	0.140	0.130	0.098		0.11	0.079	0.072	0.17	0.120	0.19	0.170	0.2	0.14	0.135	0.21
MW-40A	Methyl Ethyl Ketone	1500		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.5	<0.1	<0.1	<0.012	<0.1	0.0036	<0.0018
MW-40A	Toluene	100	0.320	0.250	0.19		0.15	0.094	0.067	0.14	0.140	0.18	0.200	0.33	0.21	0.178	0.369
MW-40A	Xylenes	1000	0.1630	0.1570	0.1170		0.1240	0.0890	0.0830	0.1880	0.1330	0.2130	0.1920	0.2410	0.1540	0.1790	0.2820
MW-40A	Benzenethiol	0.24	<0.5	<0.5	<0.25		<0.5	<0.5		<0.025	<0.25						
MW-40A	Cresols, totals	120		5.400	2.820	1.390	1.190	0.290	0.540	0.380	0.126	0.200	0.137	0.162	0.164	0.1452	0.046
MW-40A	Diethyl phthalate	2000		<0.1	<0.1	<0.05	<0.1	<0.1	<0.01	<0.05	<0.05	<0.04	<0.052	<0.05	<0.021	<0.022	<0.0022
MW-40A	2,4-Dimethylphenol	49		7.70000	3.00000	4.00000	6.30000	2.80000	3.00000	4.80000	1.50000	3.00000	5.20000	4.00000	3.20000	2.90000	4.15000
MW-40A	1-Methyl naphthalene	3.1		<0.1	<0.1	<0.05	<0.1	<0.05	0.0260	<0.05	<0.05	<0.04	<0.052	<0.05	0.0260	0.2480	0.0174
MW-40A	2-Methyl naphthalene	9.8		<0.1	<0.1	<0.05	<0.1	<0.05	0.0250	<0.05	<0.05	<0.04	<0.052	<0.05	0.0250	<0.026	0.0159
MW-40A	Carbon disulfide	240		0.009	0.006	0.007	0.006	0.006	0.005	0.007	<0.025	0.008	0.007	<0.005	<0.005	0.0050	0.0045
MW-40A	Napthalene	49		<0.1	<0.1	0.064	<0.1	0.1	0.1	0.079	<0.05	0.077	0.15	0.12	0.19	0.137	0.117
MW-40A	Pentachlorophenol	0.1		<0.05	0.062	0.034	<0.05	0.054	<0.005	0.034	<0.025	0.028	0.047	<0.25	<0.1	0.0555	0.0474
MW-40A	Phenol	730		<0.1	<0.1	<0.05	<0.1	<0.01	<0.01	<0.05	<0.05	<0.04	<0.052	<0.05	<0.021	<0.015	<0.0015
MW-40A	Pyridine	2.4		<0.1	<0.1	<0.05	<0.1	<0.1	<0.01	<0.05	<0.05	<0.04	<0.052	<0.05	<0.021	<0.02	<0.002
MW-40A	Arsenic	1		0.167	0.184	0.109	0.104	0.0920		0.0934	0.0981						
MW-40A	Beryllium	0.4		<0.003	<0.003	<0.003	<0.003	<0.003	<0.004	<0.004	<0.02	<0.004	<0.02	<0.005	<0.04	0.000060	<0.00011
MW-40A	Nickel	49	<0.05	<0.05	<0.05	<0.05	<0.05	0.0306	0.0396	0.14	0.0323		0.0502	0.0309	0.0696	0.0263	0.0344
MW-40A	Selenium	5		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<1	<0.02	<0.1	0.0116	<0.4	0.00087	<0.00083
MW-40A	Vanadium	4.4		<0.08	<0.08	<0.08	<0.08	<0.08	0.00663	<0.005	<0.025	<0.005	<0.025	<0.005	<0.05	0.0047	<0.01

Table XI.C.1.a.(1)(h)

HISTORICAL ANALYTICAL RESULTS - SITE E

Well	Constit.	GWPS mg/L	Jul-12	Jan-13	Jul-13	Jan-14	Jul-14	Mar-15	Jul-15	Jan-16	Jul-16	Jan-17	Jul-17	Jan-18	Jul-18	Jan-19	Jul-19	Jan-20	Jul-20
MW-40	Acetone	2200	<0.010	<0.010	0.0153	0.023													
MW-40	Benzene	0.5	0.215	0.172	0.198	0.193	0.18	0.164	0.197	0.196	0.189	0.189	0.172	0.158	0.205	0.172	0.204	0.189	0.239
MW-40	Ethylbenzene	70	0.12	0.102	0.148	0.129	0.154	0.161	0.113	0.147	0.151	0.14	0.14	0.11	0.156	0.131	0.178	0.119	0.146
MW-40	Methyl Ethyl Ketone	1500	0.002	0.004	<0.0027	0.0057													
MW-40	Toluene	100	0.118	0.0977	0.112	0.0845	0.073	0.0652	0.0652	0.0745	0.0746	0.0751	0.0646	0.0462	0.0614	0.0661	0.0778	0.0661	0.0912
MW-40	Xylenes	1000	0.1590	0.1270	0.1560	0.1020	0.1030	0.1110	0.1110	0.0851	0.0988	0.0942	0.0967	0.0462	0.0614	0.1170	0.1100	0.0837	0.1060
MW-40	Benzenethiol	0.24		0.1120	0.1800	0.1500	0.1150	0.0663	0.1730	0.1780	0.0967	0.0851	0.0851	0.1730	0.1530	0.1010	0.1040	0.0880	0.0891
MW-40	Cresols, totals	120	0.089	0.065	0.1709	0.1933													
MW-40	Diethyl phthalate	2000	<0.0043	<0.0061	<0.0061	<0.0058													
MW-40	2,4-Dimethylphenol	49	3.73000	2.78000	3.23000	2.22000													
MW-40	1-Methyl naphthalene	3.1	0.0534	0.0466	0.0555	0.0684													
MW-40	2-Methyl naphthalene	9.8	0.0154	0.0073	<0.0048	<0.0052													
MW-40	Carbon disulfide	240	0.0007	0.0007	0.00095	0.00075													
MW-40	Napthalene	49	0.135	0.0827	0.0629	0.0499													
MW-40	Pentachlorophenol	0.1	0.0335	0.0164	0.0194	0.0129													
MW-40	Phenol	730	<0.0030	<0.0059	<0.0059	<0.0061													
MW-40	Pyridine	2.4	<0.0040	<0.017	<0.017	<0.0053													
MW-40	Arsenic	1		0.0708	0.0729	0.0703													
MW-40	Beryllium	0.4	<0.00064	<0.00064	<0.00064	<0.00064													
MW-40	Nickel	49	0.0896	0.0786	0.0708	0.0588													
MW-40	Selenium	5	<0.0027	<0.0014	<0.0014	0.003													
MW-40	Vanadium	4.4	0.0031	0.0039	0.0041	0.0037													
MW-40A	Acetone	2200	0.0161	0.0191	0.0267	0.0261													
MW-40A	Benzene	0.5	0.352	0.258	0.398	0.417	0.488	0.432	0.382	0.448	0.467	0.443	0.324	0.384	0.453	0.429	0.314	0.34	0.324
MW-40A	Ethylbenzene	70	0.2	0.157	0.232	0.235	0.258	0.284	0.191	0.239	0.232	0.244	0.244	0.223	0.226	0.197	0.169	0.18	0.172
MW-40A	Methyl Ethyl Ketone	1500	0.003	0.009	0.0072	0.0076													
MW-40A	Toluene	100	0.322	0.181	0.35	0.373	0..393	0.431	0.431	0.323	0.3790	0.4010	0.4030	0.3490	0.3650	0.3220	0.2580	0.2660	0.2340
MW-40A	Xylenes	1000	0.2780	0.1980	0.3380	0.2850	0.3720	0.3650	0.3650	0.2840	0.2950	0.2590	0.2890	0.3490	0.3650	0.2550	0.2110	0.2310	0.2120
MW-40A	Benzenethiol	0.24		0.1110	0.1630	0.1090	0.1790	0.0952	0.2900	0.2540	0.0668	0.0898	0.8900	0.1780	0.1100	0.0869	0.1150	0.0960	0.0990
MW-40A	Cresols, totals	120	0.055	0.053	0.0841	0.0966													
MW-40A	Diethyl phthalate	2000	<0.0043	0.01	<0.0061	<0.0056													
MW-40A	2,4-Dimethylphenol	49	3.70000	3.02000	4.81000	3.79000													
MW-40A	1-Methyl naphthalene	3.1	0.0271	0.0237	0.0250	0.0263													
MW-40A	2-Methyl naphthalene	9.8	0.0242	0.0202	0.0247	0.0250													
MW-40A	Carbon disulfide	240	0.0045	0.0038	0.0034	0.0041													
MW-40A	Napthalene	49	0.151	0.128	0.153	0.124													
MW-40A	Pentachlorophenol	0.1	0.0301	0.0222	0.0344	0.0241													
MW-40A	Phenol	730	<0.0030	<0.0059	<0.0059	<0.0059													
MW-40A	Pyridine	2.4	<0.0040	<0.017	<0.017	<0.0051													
MW-40A	Arsenic	1		0.0755	0.0990	0.0929													
MW-40A	Beryllium	0.4	<0.0013	<0.00064	<0.00064	<0.00064													
MW-40A	Nickel	49	0.0419	0.0386	0.0406	0.0376													
MW-40A	Selenium	5	0.0054	0.0032	0.009	0.0105													
MW-40A	Vanadium	4.4	0.0051	0.006	0.0066	0.0059													

Table XI.C.1.a.(1)(h)

HISTORICAL ANALYTICAL RESULTS - SITE E

Well	Constit.	GWPS mg/L	Jan-21	Jul-21	Jan-22	Jul-22	Jan-23	Jul-23	Jan-24	Jul-24	# Data	Date First Analysis	Max. Value (mg/L)	# Data >GWPS	Date Last >GWPS	# Data >MDL
MW-40	Acetone	2200	<0.10		0.0251	<0.0057	0.0167		<0.0057		31	Jul-01	0.39	0	na	13
MW-40	Benzene	0.5	0.405	0.3660	0.312	0.2940	0.3670	0.3280	0.3260	0.2920	88	Oct-87	3.8	17	Jan-09	86
MW-40	Ethylbenzene	70	0.225	0.161	0.138	0.124	0.158	0.132	0.157	0.144	52	Jan-97	0.23	0	na	52
MW-40	Methyl Ethyl Ketone	1500	<0.017		0.0055	<0.0039	<0.0039		0.0174		31	Jul-01	0.0174	0	na	6
MW-40	Toluene	100	0.2960	0.1640	0.1430	0.1350	0.1870	0.1720	0.1840	0.1510	52	Jan-97	0.55	0	na	52
MW-40	Xylenes	1000	0.2640	0.1540	0.1340	0.1190	0.1680	0.1550	0.1870	0.1560	52	Jan-97	0.33	0	na	52
MW-40	Benzenethiol	0.24	0.1160	0.1290	0.1950	0.0591	0.0771	0.1550	0.0784	0.1370	43	Jan-97	0.64	3	Jan-98	28
MW-40	Cresols, totals	120	0.0346		0.0155	0.0153	0.0485		0.047		31	Jul-01	32.56	0	na	31
MW-40	Diethyl phthalate	2000	<0.001		<0.0096	<0.000072	<0.00046		<0.015		31	Jul-01	0	0	na	0
MW-40	2,4-Dimethylphenol	49	3.16000		2.18000	4.42000	5.37000		7.70000		31	Jul-01	20	0	na	31
MW-40	1-Methyl naphthalene	3.1	0.0416		0.1150	0.0640	<0.00026		0.1050		31	Jul-01	0.115	0	na	13
MW-40	2-Methyl naphthalene	9.8	0.0029		<0.0096	<0.00006	<0.00032		<0.012		31	Jul-01	11	1	Jul-01	7
MW-40	Carbon disulfide	240	<0.010		<0.010	<0.0014	<0.0014		<0.0014		31	Jul-01	0.0016	0	na	6
MW-40	Napthalene	49	0.0764		0.0211	0.0107	<0.00027		0.0321		31	Jul-01	0.41	0	na	29
MW-40	Pentachlorophenol	0.1	0.0229		0.0129	0.0186	0.0335		<0.020		31	Jul-01	0.097	0	na	23
MW-40	Phenol	730	0.0019		<0.0096	<0.000027	<0.0004		<0.0055		31	Jul-01	0.038	0	na	2
MW-40	Pyridine	2.4	<0.001		<0.0096	<0.001	<0.0037		<0.21		31	Jul-01	0	0	na	0
MW-40	Arsenic	1	0.103		0.0826	0.0826	0.0765		0.109		23	Jul-01	0.218	0	na	22
MW-40	Beryllium	0.4	<0.0005		<0.001	<0.001	<0.0038		<0.0038		31	Jul-01	0.00014	0	na	1
MW-40	Nickel	49	0.048		0.0435	0.0437	0.052		0.0717		31	Jul-01	0.109	0	na	31
MW-40	Selenium	5	0.0014		<0.005	<0.005	<0.014		<0.014		31	Jul-01	0.0867	0	na	4
MW-40	Vanadium	4.4	0.0037		0.0016	0.0016	<0.0018		0.0021		31	Jul-01	0.0284	0	na	13
MW-40A	Acetone	2200	<0.10		<0.500	<0.0057	0.0324		0.0208		31	Jul-01	0.57	0	na	13
MW-40A	Benzene	0.5	0.294	0.3870	0.375	0.3050	0.3270	0.3200	0.2970	0.3380	88	Oct-87	2.3	13	Jul-00	85
MW-40A	Ethylbenzene	70	0.158	0.177	0.22	0.185	0.207	0.199	0.182	0.177	52	Jan-97	0.284	0	na	52
MW-40A	Methyl Ethyl Ketone	1500	<0.017		<0.100	<0.00078	0.0105		0.0192		31	Jul-01	0.12	0	na	8
MW-40A	Toluene	100	0.1150	0.2500	0.2440	0.2150	0.2220	0.2370	0.2330	0.2160	52	Jan-97	0.95	0	na	51
MW-40A	Xylenes	1000	0.1190	0.2220	0.2670	0.2520	0.2480	0.2430	0.2270	0.2080	52	Jan-97	0.372	0	na	52
MW-40A	Benzenethiol	0.24	0.0859	0.0711	0.1450	<0.011	0.0729	0.1860	0.0540	0.1500	43	Jan-97	2.2	5	Jul-17	27
MW-40A	Cresols, totals	120	0.0123		0.0281	0.0472	0.0644		0.0324		31	Jul-01	29	0	na	31
MW-40A	Diethyl phthalate	2000	<0.001		<0.0095	<0.000072	<0.00046		<0.0074		31	Jul-01	0.01	0	na	1
MW-40A	2,4-Dimethylphenol	49	1.84000		2.50000	4.18000	3.52000		4.25000		31	Jul-01	15	0	na	31
MW-40A	1-Methyl naphthalene	3.1	0.0708		0.0722	0.0434	0.0542		0.0632		31	Jul-01	0.248	0	na	14
MW-40A	2-Methyl naphthalene	9.8	<0.0013		0.0049	0.0012	<0.00032		<0.0061		31	Jul-01	0.025	0	na	9
MW-40A	Carbon disulfide	240	<0.010		<0.050	0.0013	<0.0014		<0.0014		31	Jul-01	0.011	0	na	24
MW-40A	Napthalene	49	0.0083		0.108	0.0587	0.0694		0.0624		31	Jul-01	0.19	0	na	23
MW-40A	Pentachlorophenol	0.1	0.0124		0.0148	0.013	0.0211		<0.010		31	Jul-01	0.073	0	na	22
MW-40A	Phenol	730	0.0017		<0.0095	<0.000027	0.027		<0.0027		31	Jul-01	0.16	0	na	4
MW-40A	Pyridine	2.4	0.0011		<0.0095	<0.001	<0.0037		<0.11		31	Jul-01	0.01	0	na	2
MW-40A	Arsenic	1	0.0819		0.0927	0.0926	0.0991		0.0971		23	Jul-01	0.2	0	na	22
MW-40A	Beryllium	0.4	<0.0020		<0.001	<0.001	<0.0038		<0.0038		31	Jul-01	0.00006	0	na	1
MW-40A	Nickel	49	0.0463		0.0406	0.0127	0.0547		0.0542		31	Jul-01	0.14	0	na	19
MW-40A	Selenium	5	0.0011		<0.005	<0.005	<0.014		<0.014		31	Jul-01	0.0116	0	na	7
MW-40A	Vanadium	4.4	0.0016		0.0033	0.0031	0.0037		0.0036		31	Jul-01	0.00663	0	na	11

Table XI.C.1.a.(1)(h)

HISTORICAL ANALYTICAL RESULTS - SITE E

Well	Constit.	GWPS mg/L	OCT-87	FEB-88	JUN-88	SEP-88	JAN-89	APR-89	JUL-89	OCT-89	JAN-90	APR-90	JUL-90	OCT-90	JAN-91	APR-91	JUL-91	OCT-91	JAN-92
MW-41	Acetone	2200																	
MW-41	Benzene	0.5	0.440	0.340	0.480	0.380	0.887	0.693	1.400	0.639	0.852	1.140	1.020	0.815	0.660	0.608	0.900	0.890	0.384
MW-41	Ethylbenzene	70																	
MW-41	Methyl Ethyl Ketone	1500																	
MW-41	Toluene	100																	
MW-41	Xylenes	1000																	
MW-41	Benzenethiol	0.24																	
MW-41	Cresols, totals	120																	
MW-41	Diethyl phthalate	2000																	
MW-41	2,4-Dimethylphenol	49																	
MW-41	1-Methyl naphthalene	3.1																	
MW-41	2-Methyl naphthalene	9.8																	
MW-41	Carbon disulfide	240																	
MW-41	Napthalene	49																	
MW-41	Pentachlorophenol	0.1																	
MW-41	Phenol	730																	
MW-41	Pyridine	2.4																	
MW-41	Arsenic	1																	
MW-41	Beryllium	0.4																	
MW-41	Nickel	49																	
MW-41	Selenium	5																	
MW-41	Vanadium	4.4																	
MW-41A	Acetone	2200																	
MW-41A	Benzene	0.5	0.380	0.012	0.010	<0.005	0.017	0.017	<0.1	0.020	0.027	0.030	0.041	0.162	0.160	0.220	0.344	0.150	0.046
MW-41A	Ethylbenzene	70																	
MW-41A	Methyl Ethyl Ketone	1500																	
MW-41A	Toluene	100																	
MW-41A	Xylenes	1000																	
MW-41A	Benzenethiol	0.24																	
MW-41A	Cresols, totals	120																	
MW-41A	Diethyl phthalate	2000																	
MW-41A	2,4-Dimethylphenol	49																	
MW-41A	1-Methyl naphthalene	3.1																	
MW-41A	2-Methyl naphthalene	9.8																	
MW-41A	Carbon disulfide	240																	
MW-41A	Napthalene	49																	
MW-41A	Pentachlorophenol	0.1																	
MW-41A	Phenol	730																	
MW-41A	Pyridine	2.4																	
MW-41A	Arsenic	1																	
MW-41A	Beryllium	0.4																	
MW-41A	Nickel	49																	
MW-41A	Selenium	5																	
MW-41A	Vanadium	4.4																	

Table XI.C.1.a.(1)(h)

HISTORICAL ANALYTICAL RESULTS - SITE E

Well	Constit.	GWPS mg/L	APR-92	JUL-92	OCT-92	JAN-93	MAR-93	JUL-93	OCT-93	FEB-94	APR-94	JUL-94	OCT-94	JAN-95	APR-95	JUL-95	OCT-95	JAN-96	JUL-96
MW-41	Acetone	2200																	
MW-41	Benzene	0.5	0.950	0.870	0.960	1.100	1.000	0.970	1.000	0.980	0.820	1.000	0.880	9.500	0.680	0.400	0.480	0.410	0.806
MW-41	Ethylbenzene	70																	
MW-41	Methyl Ethyl Ketone	1500																	
MW-41	Toluene	100																	
MW-41	Xylenes	1000																	
MW-41	Benzenethiol	0.24																	
MW-41	Cresols, totals	120																	
MW-41	Diethyl phthalate	2000																	
MW-41	2,4-Dimethylphenol	49																	
MW-41	1-Methyl naphthalene	3.1																	
MW-41	2-Methyl naphthalene	9.8																	
MW-41	Carbon disulfide	240																	
MW-41	Napthalene	49																	
MW-41	Pentachlorophenol	0.1																	
MW-41	Phenol	730																	
MW-41	Pyridine	2.4																	
MW-41	Arsenic	1																	
MW-41	Beryllium	0.4																	
MW-41	Nickel	49																	
MW-41	Selenium	5																	
MW-41	Vanadium	4.4																	
MW-41A	Acetone	2200																	
MW-41A	Benzene	0.5	0.100	0.120	0.100	0.110	0.120	0.130	0.1200	0.120	0.160	0.180	0.250	0.190	0.300	0.310	2.600	0.193	0.233
MW-41A	Ethylbenzene	70																	
MW-41A	Methyl Ethyl Ketone	1500																	
MW-41A	Toluene	100																	
MW-41A	Xylenes	1000																	
MW-41A	Benzenethiol	0.24																	
MW-41A	Cresols, totals	120																	
MW-41A	Diethyl phthalate	2000																	
MW-41A	2,4-Dimethylphenol	49																	
MW-41A	1-Methyl naphthalene	3.1																	
MW-41A	2-Methyl naphthalene	9.8																	
MW-41A	Carbon disulfide	240																	
MW-41A	Napthalene	49																	
MW-41A	Pentachlorophenol	0.1																	
MW-41A	Phenol	730																	
MW-41A	Pyridine	2.4																	
MW-41A	Arsenic	1																	
MW-41A	Beryllium	0.4																	
MW-41A	Nickel	49																	
MW-41A	Selenium	5																	
MW-41A	Vanadium	4.4																	

Table XI.C.1.a.(1)(h)

HISTORICAL ANALYTICAL RESULTS - SITE E

Well	Constit.	GWPS mg/L	JAN-97	JUL-97	JAN-98	JUL-98	Jan-99	Jan-00	Jul-00	Jan-01	Jul-01	Jan-02	Jul-02	Jan-03	Jul-03	Jan-04	Jul-04	Jan-05
MW-41	Acetone	2200									<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
MW-41	Benzene	0.5	0.730	0.520	0.550	0.460		0.240	0.160	0.150	0.140	0.190	0.280	0.260	0.180	0.170	0.160	0.140
MW-41	Ethylbenzene	70	0.170	0.160	0.220	0.180				0.140	0.100	0.140	0.140	0.160	0.130	0.140	0.110	0.110
MW-41	Methyl Ethyl Ketone	1500									<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
MW-41	Toluene	100	0.160	0.170	0.180	0.150				0.074	0.052	0.083	0.100	0.110	0.077	0.080	0.067	0.065
MW-41	Xylenes	1000	0.3000	0.2100	0.2900	0.2400				0.1280	0.0940	0.1290	0.1420	0.1490	0.1240	0.1270	0.0970	0.0940
MW-41	Benzenethiol	0.24	0.5500	0.1100	<0.50	<0.250					<0.0025	0.0380	<2.5	<2.5	<1	<1	<0.4	<0.4
MW-41	Cresols, totals	120									0.900	2.600	2.200	1.100	2.070	0.910	0.750	0.780
MW-41	Diethyl phthalate	2000									<0.1	<0.02	<0.1	<0.1	<0.04	<0.04	<0.04	<0.1
MW-41	2,4-Dimethylphenol	49									0.89000	0.86000	1.90000	0.99000	1.60000	0.32000	0.85000	1.10000
MW-41	1-Methyl naphthalene	3.1									<0.1	0.1000	<0.1	0.0460	0.0930	0.0810	0.0970	0.1000
MW-41	2-Methyl naphthalene	9.8									<0.1	0.0340	<0.1	<0.1	<0.04	<0.04	<0.04	<0.1
MW-41	Carbon disulfide	240									<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
MW-41	Napthalene	49									<0.1	0.066	<0.1	0.030	0.057	0.050	0.058	<0.1
MW-41	Pentachlorophenol	0.1									<0.05	0.015	<0.05	<0.05	0.023	<0.02	<0.02	<0.05
MW-41	Phenol	730									<0.1	0.020	<0.1	<0.1	<0.04	<0.04	<0.04	<0.04
MW-41	Pyridine	2.4									<0.1	0.020	<0.1	<0.1	<0.04	<0.04	<0.04	<0.04
MW-41	Arsenic	1									0.097	0.104	0.09	0.0763	0.0747	0.0752	0.0681	0.067
MW-41	Beryllium	0.4									<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
MW-41	Nickel	49									<0.05	<0.05	0.053	<0.05	<0.05	0.053	0.055	<0.05
MW-41	Selenium	5									<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW-41	Vanadium	4.4									<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
MW-41A	Acetone	2200									<0.1	<0.1	<0.1	<0.1	<0.1	<0.01	<0.01	<0.01
MW-41A	Benzene	0.5	0.210	0.230	0.550	0.210		0.170	0.081	0.084	<0.005	0.056	0.094	0.110	0.079	0.080	0.080	0.081
MW-41A	Ethylbenzene	70	0.088	0.083	0.220	0.110				0.100	<0.005	0.026	0.083	0.110	0.078	0.077	0.059	0.065
MW-41A	Methyl Ethyl Ketone	1500									<0.1	<0.1	<0.1	<0.1	<0.1	<0.01	<0.01	<0.01
MW-41A	Toluene	100	0.120	0.100	0.180	<0.089				0.038	<0.005	0.014	0.036	0.042	0.029	0.031	0.028	0.031
MW-41A	Xylenes	1000	0.0440	0.1100	0.2900	0.1400				0.0800	<0.005	0.0190	0.0620	0.0770	0.0530	0.0490	0.0370	0.0420
MW-41A	Benzenethiol	0.24	0.4800	0.0820	<0.50	<0.250					<0.0025	<0.5	<2.5	<0.5	<1	<0.25	0.3500	<1
MW-41A	Cresols, totals	120									0.095	0.810	0.260	0.034	0.076	<0.01	<0.01	<0.01
MW-41A	Diethyl phthalate	2000									<0.1	<0.02	<0.1	<0.02	<0.04	<0.01	<0.01	<0.01
MW-41A	2,4-Dimethylphenol	49									0.40000	0.49000	1.00000	0.29000	0.36000	0.05700	0.09300	0.26000
MW-41A	1-Methyl naphthalene	3.1									<0.1	0.0680	<0.1	0.0510	0.0760	0.0380	0.0640	<0.1
MW-41A	2-Methyl naphthalene	9.8									<0.1	<0.02	<0.1	<0.02	<0.04	<0.01	<0.01	<0.01
MW-41A	Carbon disulfide	240									<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
MW-41A	Napthalene	49									<0.1	<0.02	<0.1	<0.02	<0.04	<0.01	<0.01	<0.01
MW-41A	Pentachlorophenol	0.1									<0.05	0.015	<0.05	<0.01	0.021	<0.005	<0.005	<0.005
MW-41A	Phenol	730									<0.1	<0.02	<0.1	<0.02	<0.04	<0.01	<0.01	<0.01
MW-41A	Pyridine	2.4									<0.1	<0.02	<0.1	<0.02	<0.04	<0.01	<0.01	<0.01
MW-41A	Arsenic	1									0.0612	0.0883	0.08	0.0685	0.0607	0.054	0.548	0.0533
MW-41A	Beryllium	0.4									<0.003	<0.003	<0.003	<0.003	<0.03	<0.03	<0.03	<0.03
MW-41A	Nickel	49									<0.05	<0.05	<0.05	<0.05	0.052	<0.05	<0.05	<0.05
MW-41A	Selenium	5									<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW-41A	Vanadium	4.4									<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08

Table XI.C.1.a.(1)(h)

HISTORICAL ANALYTICAL RESULTS - SITE E

Well	Constit.	GWPS mg/L	Apr-05	Jul-05	Jan-06	Jul-06	Jan-07	Jul-07	Jan-08	Jul-08	Jan-09	Jul-09	Jan-10	Jul-10	Jan-11	Jul-11	Jan-12
MW-41	Acetone	2200		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.012	<0.1	0.0157	<0.010
MW-41	Benzene	0.5		0.150	0.270	0.220	0.200	0.24	0.180	0.230	0.220	0.250	0.210	0.220	0.160	0.109	0.184
MW-41	Ethylbenzene	70	0.100	0.200	0.22		0.19	0.21	0.15	0.18	0.230	0.25	0.260	0.29	0.24	0.0953	0.24
MW-41	Methyl Ethyl Ketone	1500		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.012	<0.1	.<0.0018	0.005
MW-41	Toluene	100	0.060	0.120	0.082		0.072	0.067	0.064	0.085	0.095	0.071	0.074	0.057	0.048	0.0192	0.0448
MW-41	Xylenes	1000	0.1000	0.2060	0.2110		0.1520	0.1770	0.1250	0.3100	0.3800	0.2140	0.2740	0.2020	0.1860	0.0835	0.2200
MW-41	Benzenethiol	0.24	<0.5	<0.5	<0.25		<0.5	<0.5		<0.025	<0.025						
MW-41	Cresols, totals	120		0.370	1.100	0.970	0.740	0.410	0.345	0.220	0.230	0.142	0.120	0.210	0.041	0.0257	0.007
MW-41	Diethyl phthalate	2000		<0.1	<0.1	<0.05	<0.1	<0.1	<0.01	<0.05	<0.05	<0.04	<0.053	<0.051	<0.02	<0.0043	<0.0011
MW-41	2,4-Dimethylphenol	49		0.76000	2.50000	2.20000	1.70000	1.60000	0.30000	2.30000	1.90000	1.40000	1.50000	1.30000	0.80000	0.55100	0.65200
MW-41	1-Methyl naphthalene	3.1		<0.1	<0.1	0.0990	0.1000	<0.1	0.1300	0.1200	0.1300	0.0940	0.1500	0.1600	0.1800	0.0156	0.1470
MW-41	2-Methyl naphthalene	9.8		<0.1	<0.1	0.1100	0.1200	<0.1	0.1300	0.1200	0.1300	0.0700	0.0830	<0.051	<0.02	<0.0052	<0.0013
MW-41	Carbon disulfide	240		<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.00036	<0.001
MW-41	Napthalene	49		<0.1	<0.1	0.12	0.13	0.11	0.12	0.085	0.12	0.072	0.12	0.76	0.026	0.0228	0.0236
MW-41	Pentachlorophenol	0.1		<0.05	<0.05	<0.025	<0.05	<0.05	0.005	<0.025	<0.025	<0.02	0.027	<0.025	<0.1	0.0115	0.0129
MW-41	Phenol	730		<0.1	<0.1	<0.05	<0.1	<0.01	<0.01	<0.05	<0.05	<0.04	<0.053	<0.051	<0.02	<0.003	<0.00078
MW-41	Pyridine	2.4		<0.1	<0.1	<0.05	<0.1	<0.1	<0.01	<0.05	<0.05	<0.04	<0.053	<0.051	<0.02	<0.004	<0.001
MW-41	Arsenic	1		0.0589	0.0733	0.0649	0.055	0.0489		0.0549	0.044						
MW-41	Beryllium	0.4		<0.003	<0.003	<0.003	<0.003	<0.003	<0.004	<0.004	<0.004	<0.004	<0.02	<0.005	<0.04	0.000059	<0.000023
MW-41	Nickel	49	<0.05	<0.05	<0.05	<0.05	<0.05	0.0443	0.0317	0.0335	0.029		0.0355	0.0267	<0.05	0.019	0.0225
MW-41	Selenium	5		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.1	<0.01	<0.2	0.0011	<0.0010
MW-41	Vanadium	4.4		<0.08	<0.08	<0.08	<0.08	<0.08	<0.005	<0.005	0.0318	<0.005	<0.025	<0.005	<0.05	0.0022	0.0022
MW-41A	Acetone	2200		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.012	<0.1	0.0417	<0.01
MW-41A	Benzene	0.5		0.160	0.270	0.300	0.230	0.24	0.150	0.170	0.200	0.200	0.180	0.230	0.190	0.0252	0.204
MW-41A	Ethylbenzene	70	0.063	0.080	0.110		0.099	0.088	0.066	0.093	0.140	0.086	0.098	0.110	0.100	0.002	0.079
MW-41A	Methyl Ethyl Ketone	1500		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.012	<0.1	<0.0018	<0.0018
MW-41A	Toluene	100	0.045	0.180	0.250		0.170	0.110	0.088	0.080	0.110	0.086	0.091	0.097	0.092	0.005	0.102
MW-41A	Xylenes	1000	0.0460	0.0850	0.1280		0.1160	0.0990	0.0700	0.0950	0.1560	0.0830	0.0920	0.1020	0.0890	0.0023	0.0829
MW-41A	Benzenethiol	0.24	<0.5	<0.5	<0.25		<0.5	<0.5		<0.025	<0.1						
MW-41A	Cresols, totals	120		0.390	0.170	0.320	0.110	<0.1	0.105	0.054	0.029	0.046	<0.052	<0.051	0.066	0.0315	0.083
MW-41A	Diethyl phthalate	2000		<0.1	<0.1	<0.05	<0.1	<0.1	<0.1	<0.05	<0.02	<0.04	<0.052	<0.051	<0.02	<0.022	<0.0023
MW-41A	2,4-Dimethylphenol	49		2.70000	2.60000	4.30000	4.40000	2.70000	0.83000	3.40000	1.80000	1.50000	3.10000	2.80000	2.20000	2.77000	4.27000
MW-41A	1-Methyl naphthalene	3.1		<0.1	<0.1	0.0600	<0.1	<0.1	0.0630	0.0510	0.0360	<0.04	0.0670	0.0750	0.0680	0.0759	0.0416
MW-41A	2-Methyl naphthalene	9.8		<0.1	<0.1	<0.05	<0.1	<0.1	<0.1	<0.05	<0.02	<0.04	<0.052	<0.051	<0.02	<0.026	0.0122
MW-41A	Carbon disulfide	240		<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.00036	0.0023
MW-41A	Napthalene	49		<0.1	<0.1	0.058	<0.1	<0.1	0.073	0.056	0.04	0.055	0.12	0.15	0.17	0.123	0.0995
MW-41A	Pentachlorophenol	0.1		<0.05	<0.05	0.042	<0.05	<0.05	0.022	0.035	0.019	<0.02	<0.026	<0.026	<0.1	0.0583	0.043
MW-41A	Phenol	730		<0.1	<0.1	<0.05	<0.1	<0.01	<0.01	<0.05	<0.02	<0.04	<0.052	<0.0051	<0.02	<0.015	<0.0016
MW-41A	Pyridine	2.4		<0.1	<0.1	<0.05	<0.1	<0.1	<0.01	<0.05	<0.02	<0.04	<0.052	<0.051	<0.02	<0.02	<0.0021
MW-41A	Arsenic	1		0.084	0.112	0.111	0.0807	0.0704		0.0655	0.0773						
MW-41A	Beryllium	0.4		<0.003	<0.003	<0.003	<0.003	<0.003	<0.004	<0.004	<0.02	<0.004	<0.02	<0.005	<0.04	0.000082	<0.00011
MW-41A	Nickel	49	<0.05	<0.05	<0.05	0.0509	<0.05	0.0436	0.0411	2.44	0.0361		0.0542	0.0402	0.0631	0.0304	0.0332
MW-41A	Selenium	5		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.5	<0.02	<0.1	<0.01	<0.2	0.00087	<0.00083
MW-41A	Vanadium	4.4		<0.08	<0.08	<0.08	<0.08	<0.08	0.01	0.01	<0.025	0.01	<0.025	0.01	<0.05	0.01	<0.010

Table XI.C.1.a.(1)(h)

HISTORICAL ANALYTICAL RESULTS - SITE E

Well	Constit.	GWPS mg/L	Jul-12	Jan-13	Jul-13	Jan-14	Jul-14	Mar-15	Jul-15	Jan-16	Jul-16	Jan-17	Jul-17	Jan-18	Jul-18	Jan-19	Jul-19	Jan-20	Jul-20
MW-41	Acetone	2200	DRY	<0.010	0.0165	0.0196													
MW-41	Benzene	0.5		0.25	0.249	0.244	0.31	0.36	0.362	0.435	0.429	0.372	0.373	0.264	0.375	0.361	0.319	0.344	0.268
MW-41	Ethylbenzene	70	DRY	0.323	0.309	0.273	0.356	0.437	0.308	0.368	0.32	0.274	0.274	0.205	0.256	0.252	0.261	0.265	0.252
MW-41	Methyl Ethyl Ketone	1500	DRY	0.004	0.0061	0.0054													
MW-41	Toluene	100	DRY	0.0465	0.0552	0.5	0.0554	0.0575	0.0575	0.0463	0.0540	0.0459	0.0476	0.0351	0.0448	0.0417	0.0450	0.0398	0.0344
MW-41	Xylenes	1000		0.3090	0.2910	0.2300	0.3340	0.3070	0.3070	0.2390	0.2710	0.2030	0.2160	0.0351	0.0448	0.1590	0.1570	0.1400	0.1280
MW-41	Benzenethiol	0.24		0.0928	0.1710	0.1980	0.1570	0.1100	0.2740	0.2930	0.1010	0.1920	0.1920	0.1800	0.1450	0.1270	0.1990	0.1390	0.1800
MW-41	Cresols, totals	120	DRY	0.006	0.023	0.0161													
MW-41	Diethyl phthalate	2000	DRY	<0.0061	<0.0061	<0.0056													
MW-41	2,4-Dimethylphenol	49	DRY	0.69700	1.76000	0.97200													
MW-41	1-Methyl naphthalene	3.1	DRY	0.1560	0.1360	0.1540													
MW-41	2-Methyl naphthalene	9.8	DRY	<0.0048	<0.0048	<0.005													
MW-41	Carbon disulfide	240	DRY	<0.00036	<0.00036	<0.00036													
MW-41	Napthalene	49	DRY	0.0242	0.041	0.0175													
MW-41	Pentachlorophenol	0.1	DRY	0.0041	0.0172	0.0044													
MW-41	Phenol	730	DRY	<0.0059	<0.0059	<0.0059													
MW-41	Pyridine	2.4	DRY	<0.017	<0.017	<0.0051													
MW-41	Arsenic	1		0.0518	0.0700	0.0641													
MW-41	Beryllium	0.4	DRY	<0.00064	<0.00064	<0.00064													
MW-41	Nickel	49	DRY	0.0404	0.04	0.0402													
MW-41	Selenium	5	DRY	<0.0014	0.0022	0.0037													
MW-41	Vanadium	4.4	DRY	0.0022	0.0037	0.003													
MW-41A	Acetone	2200	<0.010	0.0453	0.0201	0.0118													
MW-41A	Benzene	0.5	0.209	0.179	0.202	0.198	0.166	dry	0.178	0.211	0.216	0.195	0.285	0.171	0.258	0.226	0.112	0.141	0.124
MW-41A	Ethylbenzene	70	0.270	0.070	0.0835	0.066	0.051	dry	0.0592	0.072	0.0738	0.070	0.0697	0.068	0.093	0.085	0.057	0.074	0.079
MW-41A	Methyl Ethyl Ketone	1500	0.003	<0.0027	0.0046	<0.0027													
MW-41A	Toluene	100	0.045	0.087	0.0992	0.083	0.0666	dry	dry	0.082	0.0875	0.0824	0.0845	0.0731	0.1200	0.1010	0.0392	0.0565	0.0418
MW-41A	Xylenes	1000	0.2400	0.0795	0.0986	0.0727	0.0582			0.0703	0.0833	0.0765	0.0832	0.0731	0.1200	0.0986	0.0375	0.0570	0.0462
MW-41A	Benzenethiol	0.24		0.1950	0.2360	0.2650	0.1640		0.2180	0.2820	0.0849	0.0775	0.0775	0.1770	0.1400	0.1050	0.0461	0.0703	0.0657
MW-41A	Cresols, totals	120	0.009	0.013	0.0301	0.0215													
MW-41A	Diethyl phthalate	2000	<0.0043	<0.0061	<0.0061	<0.0056													
MW-41A	2,4-Dimethylphenol	49	0.81100	3.74000	3.28000	2.46000													
MW-41A	1-Methyl naphthalene	3.1	0.1420	0.0627	0.1270	0.0397													
MW-41A	2-Methyl naphthalene	9.8	<0.0052	<0.0048	<0.0048	<0.005													
MW-41A	Carbon disulfide	240	<0.00036	0.0011	0.0015	0.0015													
MW-41A	Napthalene	49	0.0276	0.0597	0.0571	0.0229													
MW-41A	Pentachlorophenol	0.1	0.0054	0.0272	0.0315	0.0266													
MW-41A	Phenol	730	<0.0030	<0.0059	<0.0059	<0.0059													
MW-41A	Pyridine	2.4	<0.0040	<0.017	<0.017	<0.0051													
MW-41A	Arsenic	1		0.1100	0.1170	0.1310													
MW-41A	Beryllium	0.4	<0.00064	<0.00064	<0.00064	<0.00064													
MW-41A	Nickel	49	0.0318	0.0427	0.047	0.0472													
MW-41A	Selenium	5	<0.0014	<0.0014	0.0017	0.004													
MW-41A	Vanadium	4.4	0.00	0.01	0.01	0.01													

Table XI.C.1.a.(1)(h)

HISTORICAL ANALYTICAL RESULTS - SITE E

Well	Constit.	GWPS mg/L	Jan-21	Jul-21	Jan-22	Jul-22	Jan-23	Jul-23	Jan-24	Jul-24	# Data	Date First Analysis	Max. Value (mg/L)	# Data >GWPS	Date Last >GWPS	# Data >MDL
MW-41	Acetone	2200	<0.050		<0.250	<0.0011	0.0049		0.0073		31	Jul-01	0.0196	0	na	5
MW-41	Benzene	0.5	0.254	0.2270	0.156	0.1940	0.1830	0.1340	0.1270	0.1250	87	Oct-87	9.5	29	Jan-98	86
MW-41	Ethylbenzene	70	0.24	0.199	0.128	0.148	0.159	0.105	0.137	0.153	52	Jan-97	0.437	0	na	51
MW-41	Methyl Ethyl Ketone	1500	<0.0083		0.0097	<0.00078	0.0014		<0.00078		31	Jul-01	0.0097	0	na	6
MW-41	Toluene	100	0.0315	0.0295	0.0225	0.0317	0.0370	0.0308	0.0367	0.0323	52	Jan-97	0.5	0	na	51
MW-41	Xylenes	1000	0.1160	0.1270	0.0656	0.0821	0.0819	0.0558	0.0758	0.0684	51	Jan-97	0.38	0	na	51
MW-41	Benzenethiol	0.24	0.0995	0.2860	0.1500	0.1320	0.1080	0.1740	0.1610	0.1550	43	Jan-97	0.55	4	Jan-21	27
MW-41	Cresols, totals	120	0.0031		0.0013	0.008	<0.0020		0.0069		31	Jul-01	2.6	0	na	29
MW-41	Diethyl phthalate	2000	<0.0010		<0.0048	<0.000072	<0.00046		<0.00074		31	Jul-01	0	0	na	0
MW-41	2,4-Dimethylphenol	49	0.22400		0.08110	0.17800	0.17800		0.43400		31	Jul-01	2.5	0	na	30
MW-41	1-Methyl naphthalene	3.1	0.0902		0.0915	0.1080	0.0940		0.1120		31	Jul-01	0.18	0	na	25
MW-41	2-Methyl naphthalene	9.8	<0.0013		<0.0048	<0.00006	<0.00032		<0.00061		31	Jul-01	0.13	0	na	8
MW-41	Carbon disulfide	240	<0.005		<0.025	<0.00027	<0.00027		<0.00027		31	Jul-01	0	0	na	0
MW-41	Napthalene	49	0.0044		0.0057	0.0066	0.0055		0.0062		31	Jul-01	0.76	0	na	25
MW-41	Pentachlorophenol	0.1	0.0024		<0.024	0.0017	<0.0047		0.0023		31	Jul-01	0.027	0	na	12
MW-41	Phenol	730	<0.0011		<0.0048	<0.000027	<0.00040		<0.00027		31	Jul-01	0.02	0	na	1
MW-41	Pyridine	2.4	0.0017		0.0024	<0.001	<0.0037		<0.011		31	Jul-01	0.02	0	na	3
MW-41	Arsenic	1	0.0554		0.0641	0.0604	0.0554		0.0674		23	Jul-01	0.104	0	na	22
MW-41	Beryllium	0.4	<0.0005		<0.001	<0.001	<0.0038		<0.0038		31	Jul-01	0.000059	0	na	1
MW-41	Nickel	49	0.04		0.0406	0.0414	0.0524		0.057		31	Jul-01	0.057	0	na	19
MW-41	Selenium	5	0.0014		<0.005	<0.005	<0.014		<0.014		31	Jul-01	0.0037	0	na	4
MW-41	Vanadium	4.4	0.0024		0.0028	0.0028	0.0022		0.003		31	Jul-01	0.0318	0	na	11
MW-41A	Acetone	2200	<0.10		<0.500	<0.0011	0.0098		0.0118		31	Jul-01	0.0453	0	na	6
MW-41A	Benzene	0.5	0.148	0.1520	0.136	0.1530	0.1690	0.1370	0.1520	0.2550	88	Oct-87	2.6	2	Jan-98	83
MW-41A	Ethylbenzene	70	0.090	0.081	0.078	0.082	0.103	0.074	0.080	0.089	52	Jan-97	0.27	0	na	50
MW-41A	Methyl Ethyl Ketone	1500	<0.017		0.0314	0.0153	0.0111		0.0077		31	Jul-01	0.0314	0	na	6
MW-41A	Toluene	100	0.0488	0.0451	0.0423	0.0404	0.0484	0.0404	0.0477	0.1010	52	Jan-97	0.25	0	na	48
MW-41A	Xylenes	1000	0.0530	0.0485	0.0453	0.0462	0.0566	0.0432	0.0504	0.1020	50	Jan-97	0.29	0	na	49
MW-41A	Benzenethiol	0.24	0.0634	0.0744	0.0647	0.0247	0.0193	0.0699	0.0260	0.1110	42	Jan-97	0.48	4	Jan-16	26
MW-41A	Cresols, totals	120	0.0755		0.0701	0.0782	0.067		0.0506		31	Jul-01	0.81	0	na	25
MW-41A	Diethyl phthalate	2000	<0.0010		<0.0048	<0.000071	<0.00046		0.0026		31	Jul-01	0.0026	0	na	1
MW-41A	2,4-Dimethylphenol	49	0.26900		0.20100	0.21300	0.19000		0.60300		31	Jul-01	4.4	0	na	31
MW-41A	1-Methyl naphthalene	3.1	0.0495		0.0514	0.0413	0.0465		0.0527		31	Jul-01	0.142	0	na	23
MW-41A	2-Methyl naphthalene	9.8	0.0218		0.0276	0.0233	0.0272		0.0326		31	Jul-01	0.0326	0	na	6
MW-41A	Carbon disulfide	240	<0.010		<0.050	0.0011	0.0011		<0.00027		31	Jul-01	0.0023	0	na	6
MW-41A	Napthalene	49	0.0758		0.0791	0.0666	0.0794		0.0896		31	Jul-01	0.17	0	na	19
MW-41A	Pentachlorophenol	0.1	0.0037		<0.024	0.002	<0.0047		0.003		31	Jul-01	0.0583	0	na	15
MW-41A	Phenol	730	<0.0011		<0.0048	<0.000027	<0.00040		<0.00027		31	Jul-01	0	0	na	0
MW-41A	Pyridine	2.4	<0.0011		0.0014	<0.001	<0.0037		<0.011		31	Jul-01	0.0014	0	na	1
MW-41A	Arsenic	1	0.0344		0.0363	0.0355	0.0306		0.0367		23	Jul-01	0.548	0	na	22
MW-41A	Beryllium	0.4	<0.0020		<0.001	<0.005	<0.015		<0.0075		31	Jul-01	0.000082	0	na	1
MW-41A	Nickel	49	0.0227		0.0298	0.0281	0.0321		0.0295		31	Jul-01	2.44	0	na	20
MW-41A	Selenium	5	0.0016		<0.050	<0.025	<0.056		<0.028		31	Jul-01	0.004	0	na	4
MW-41A	Vanadium	4.4	0.00		<0.010	<0.005	<0.0072		<0.0036		31	Jul-01	0.0127	0	na	10

Table XI.C.3.

GENERAL COMPLIANCE MONITORING IMPLEMENTATION SCHEDULE

ITEM	# / YEAR	# YEARS	TOTAL #	STATUS	DURATION (days)	ESTIMATED GENERAL TIME FRAME	CALENDAR YEARS PERFORMED
System Design	na	na	na	Completed	na	na	na
System Construction	na	na	na	Completed	na	na	na
System Installaltion	na	na	na	Completed	na	na	na
IMPLEMENT MONITORING PROGRAM:							
Prepare and issue Field Team Instructions	2	10	20	On-going	2	June 1 & December 1 of each calendar year	2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034
Make necessary arrangments with client, suppliers, laboratory, and team	2	10	20	On-going	1	June & December of each calendar year	2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034
Mobilize to field	2	10	20	On-going	2	January & July of each calendar year	2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034
Fluid Level Measurement	2	10	20	On-going	2	January 3-10, July 5-15 of each calendar year	2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034
Well & Component Inspections	2	10	20	On-going	2	January 3-10, July 5-15 of each calendar year	2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034
Purge & Sample Wells	2	10	20	On-going	2	January 3-10, July 5-15 of each calendar year	2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034
Ship Samples	2	10	20	On-going	1	January 11, July 16 of each calendar year	2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034
Demobilize from field	2	10	20	On-going	2	January 12-13, July 16-17 of each calendar year	2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034
LABORATORY ANALYSIS OF GROUNDWATER SAMPLES:							
Laboratory Analysis	2	10	20	On-going	21	~January 14 - February 4 & July 18 - August 8 of each calendar year	2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034
Data Evaluation (field & Laboratory)	2	10	20	On-going	30	~February 5 - March 6 & August 9 - September 8 of each calendar year	2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034
Draft Report Preparation	2	10	20	On-going	30	~March 7 - April 6 & September 9 - October 9 of each calendar year	2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034
Report review/QA	2	10	20	On-going	14	~April 7 - 21 & October 10 - 24 of each calendar year	2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034
Final Report Preparation	2	10	20	On-going	30	~April 22 - May 22 & October 25 - November 24 of each calendar year	2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034
Report Submittal	2	10	20	On-going	na	July 21 and January 21 of each calendar year	2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034

Schedule does not include possilble unpredictable delays such as weather and supply chain issues

Table XI.C.3.

GENERAL COMPLIANCE MONITORING IMPLEMENTATION SCHEDULE

Approximate Schedule for Each Calendar Year	JANUARY				FEBRUARY				MARCH				APRIL				MAY				JUNE			
	Week 1	Week 2	Week 3	Week 4	Week 1	Week 2	Week 3	Week 4	Week 1	Week 2	Week 3	Week 4	Week 1	Week 2	Week 3	Week 4	Week 1	Week 2	Week 3	Week 4	Week 1	Week 2	Week 3	Week 4
IMPLEMENT MONITORING PROGRAM:																								
Prepare and issue Field Team Instructions																					1			
Make necessary arrangments with client, suppliers, laboratory, and team																					4			30
Mobilize to field	2																							
Fluid Level Measurement	3	10																						
Well & Component Inspections	3	10																						
Purge & Sample Wells	3	10																						
Ship Samples		11																						
Demobilize from field		13																						
LABORATORY ANALYSIS OF GROUNDWATER SAMPLES:																								
Laboratory Analysis			14		4																			
Data Evaluation (field & Laboratory)					5				6															
Draft Report Preparation									7				6											
Report review/QA													7		21									
Final Report Preparation																22				22				
Report Submittal			21																					

Shading shows general timeframe in weeks

Number indicates approximate calendar day

Table XI.C.3.

GENERAL COMPLIANCE MONITORING IMPLEMENTATION SCHEDULE

Approximate Schedule for Each Calendar Year	JULY				AUGUST				SEPTEMBER				OCTOBER				NOVEMBER				DECEMBER			
	Week 1	Week 2	Week 3	Week 4	Week 1	Week 2	Week 3	Week 4	Week 1	Week 2	Week 3	Week 4	Week 1	Week 2	Week 3	Week 4	Week 1	Week 2	Week 3	Week 4	Week 1	Week 2	Week 3	Week 4
IMPLEMENT MONITO																								
Prepare and issue Field Team Instructions																					1			
Make necessary arrangments with client, suppliers, laboratory, and team																					4			31
Mobilize to field	5																							
Fluid Level Measurement	5	15																						
Well & Component Inspections	5	15																						
Purge & Sample Wells	5	15																						
Ship Samples			16																					
Demobilize from field			17																					
LABORATORY ANALY																								
Laboratory Analysis				18		8																		
Data Evaluation (field & Laboratory)						9				8														
Draft Report Preparation										9				9										
Report review/QA														10		24								
Final Report Preparation																25				24				
Report Submittal			21																					

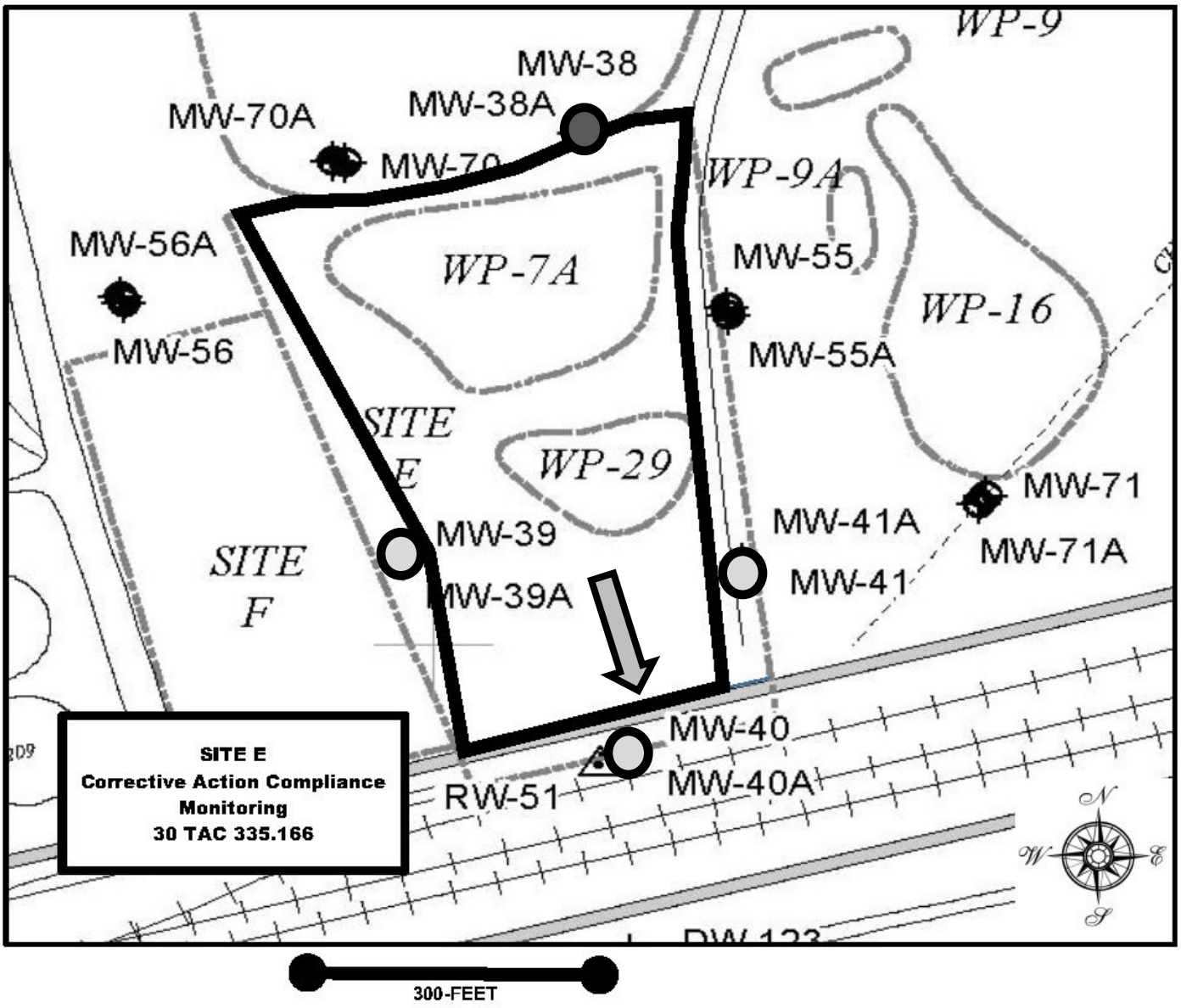
Shading shows general timeframe in weeks

Number indicates approximate calendar day

FIGURE

Figure XI.C.2.a.(1), Site E LTU Boundary & Monitoring Wells

Figure XI.C.2.a.(1) Site E LTU Boundary & Monitoring Wells



Background Wells: MW-38, MW-38A

Point of Compliance Wells: MW-39, MW-39A, MW-40, MW-40A, MW-41, MW-41A

Point of Exposure Wells: same as POC

Supplemental Wells: None

Direction of Groundwater Flow

Background Wells

Point of Compliance Wells

Alon USA, LP
Alon USA Big Spring Refinery
Big Spring, TX

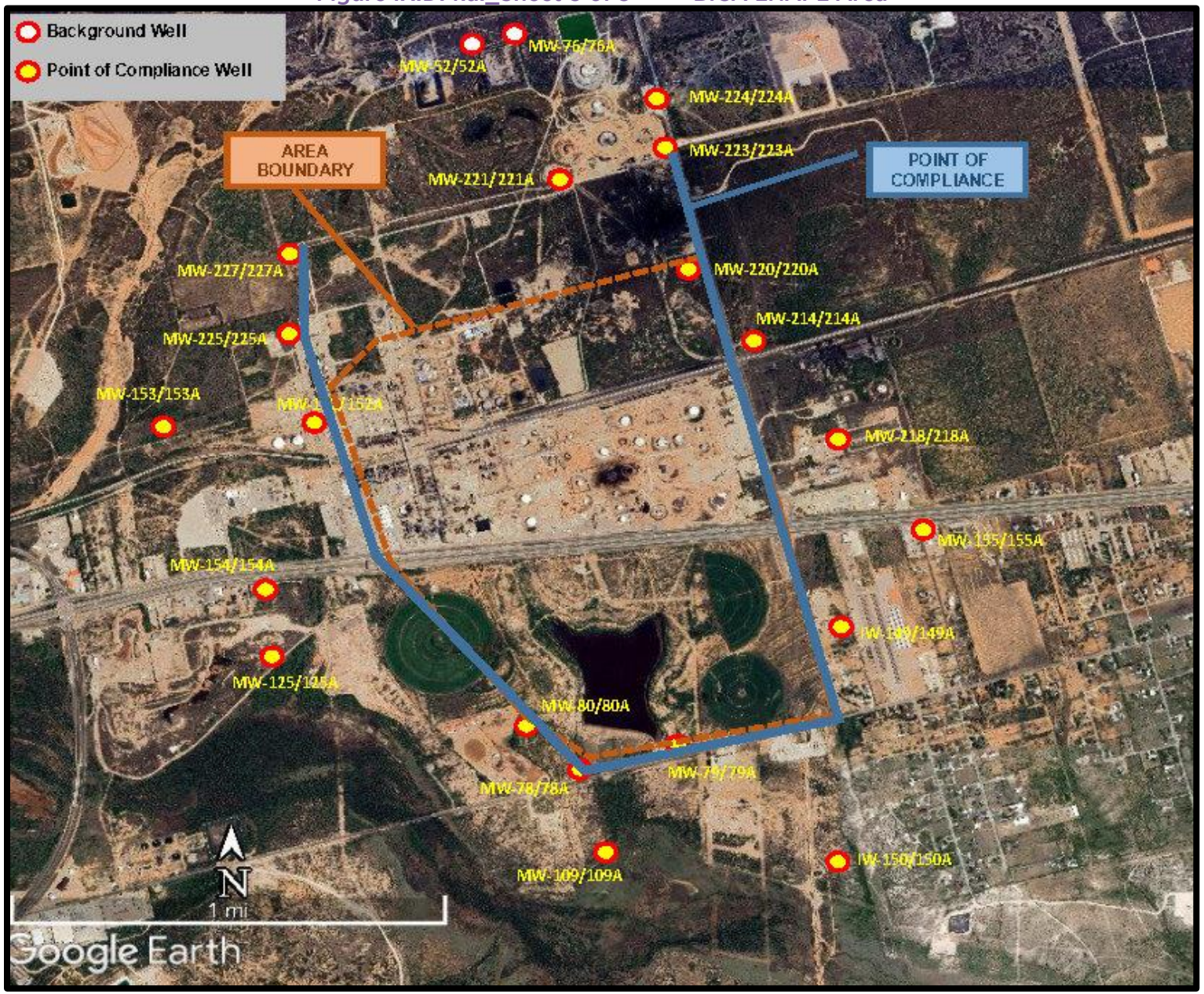
Hazardous Waste Permit 50140 - Part B
Application SWR No. 30083 / RN100250869 / CN600881783

SUBSECTION XI.D
CORRECTIVE ACTION PROGRAM

Figure XI.D.4.a._Sheet 1 of 3 Site H SWMU

Figure IX.D.4.a_Sheet 2 of 3 Site E SWMU

Figure IX.D.4.a._Sheet 3 of 3 BICA LNAPL Area



Alon USA, LP

Attachment XI.D.3.c.(2)(a)

Recovery System Design

Alon USA Big Spring Refinery – Big Spring, Texas

SWR30083 / CP50140 / RN100250869 / CN600881783

January 2024

Kyle Hagen, PE
Engineer

Signature

Texas #98869
Registration Number & State

Atlas Technical Consultants, LLC
(#F19813)
Texas Engineering Firm & Registration Number

7/15/2024
Date

Seal

NOTE: This professional engineer certification is provided to certify the summary, verification of the status, and general ongoing activities at the facility for the previously designed and constructed Recovery System. This certification is not provided for the engineering design or to certify closure or post closure care of the Recovery System.

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XI.D.3.c.(2a)-1 Summary of Groundwater Remediation System Well Completion Information and Well Materials

XI.D.3.c.(2a)-2 Historical Summary of Recovery System Production

XI.D.3.c.(2a)-3 Summary of Well Materials

FIGURES

XI.D.3.c.(2a)-1 Recovery System Well Locations

XI.D.3.c.(2a)-2 Recovery System Cross-Sections

XI.D.3.c.(2a)-3 Radius of Influence for Producing and Reinjection Wells

XI.D.3.c.(2a)-4 Recovery System Existing Collection and Treatment Layout

ATTACHMENTS

XI.D.3.c.(2a)-A Remediation System Well Logs
XI.D.3.c.(2a)-B Treatment System Information
XI.D.3.c.(2a)-C Well Installation Field Forms

SECTION 1 GENERAL INFORMATION

1.1 Introduction

The current recovery system has been in operation since the mid-1990s and is comprised of:

- 16 Phase-Separated Hydrocarbon Skimmer Wells:

RW-106	RW-175	RW-179	RW-183
RW-171	RW-176	RW-180	RW-184
RW-173	RW-177	RW-181	RW-185
RW-174	RW-178	RW-182	RW-192

- 14 Class V Treated Groundwater Reinjection Wells:

RIW-200	RIW-204	RIW-208	RIW-212
RIW-201	RIW-205R	RIW-209	RIW-213
RIW-202	RIW-206	RIW-210	
RIW-203	RIW-207	RIW-211	

- 16 Dissolved-Phase Groundwater Recovery Wells:

RW-112	RW-143	RW-147	RW-196
RW-140	RW-144	RW-170	RW-197
RW-141	RW-145	RW-194	RW-198
RW-142	RW-146	RW-195	RW-199

Table XI.D.3.c.(2a)-1 is a summary of the well construction for each of the 46 well components that make up the facility groundwater remediation system and Attachment XI.D.3.c.(2a)-A contains copies of the well construction logs. Figure XI.D.3.c.(2a)-1 is a map indicating the locations of the remediation system wells.

1.2 System Description

The groundwater remediation system at the Big Spring Refinery is composed of three distinct parts. The South Boundary 16-well portion intercepts and recovers any dissolved-phase component that moves downgradient from the LNAPL hydrocarbon plume. In addition, within the first six to eight years of production, it effectively "pulled" back the portion of the benzene plume that had already migrated off-property.

The 16 phase-separated hydrocarbon intercept wells are strategically located in the thicker portions of the plume and remove the LNAPL from the aquifer for removal to the process units. Located between these two systems is the Class V reinjection system. The system reinjects treated groundwater recovered from the South Boundary system in order to create a hydraulic mound that holds the LNAPL in place, causes LNAPL stacking which enhances the recovery by the LNAPL skimmer wells.

1.3 Historical Remediation

Since 1994 (as of the end of June 2023), the South Boundary dissolved-phase benzene plumes and the LNAPL plumes have reduced their respective plumes as shown below:

		Maximum	Jun 2023	Change
DISSOLVED-PHASE BENZEN REMOVAL SYSTEMS:				
Total Plume Areas (acres)	U. Sand	490	14	-97.19%
	L. Gravel	775	44	-94.31%
Mass Benzene (lbs)	U. Sand	23,282	13	-99.95%
	L. Gravel	22,229	72	-99.68%
LNAPL REMOVAL SYSTEMS:				
Total Plume Areas (acres)	U. Sand	348	282	-18.90%

Table XI.D.3.c.(2a)-2 is a summary of the historical monthly production of each of the recovery systems. Overall, the production has been on-going from June 1994 to present. The following are based on the production through July 2023. The historic production (by system) is listed by Pre- and Post- Explosion that destroyed the portion of the system located north and south of IH-20 and required system shut-down and re-build with updated production equipment during the facility and system re-build from February 2008 to January 2014:

System	Production Period	Groundwater		Hydrocarbons (LNAPL)	
		Volume (bbls)	Rate (bbls/day	Volume (bbls)	Rate (bbls/day
South Boundary System	Pre-Shutdown	20,387,782	2,418	na	na
	Post-Shutdown	1,711,580	203	na	na
Dual-Phase System	Pre-Shutdown	439,133	89	171,058	35
	Post-Shutdown	26,506	28	86,254	32
Re-Injection System	Pre-Shutdown	20,408,641	2,421	na	na
	Post-Shutdown	1,712,840	203	na	na

The bulk of the benzene reduction has been due to microbial activity enhanced by the upgradient injection of treated, oxygenated water and along the downgradient edges due to the lowering of the benzene concentrations to levels below the toxicity level for the in-situ microbs.
The LNAPL plume is primarily reduced by physical removal but also a significant volume is removed as it degrades and diffuses as a dissolved phase at the fringes allowing for in-situ microbial reduction.

SECTION 2 GENERAL SYSTEM DESIGN

2.1 Introduction

The following section will discuss the purpose, installation history, and general design of the existing system.

2.2 South Boundary Dissolved-Phase Recovery System

As discussed above, the South Boundary dissolved-phase recovery system is comprised of 16 recovery wells along the southern and southeastern boundary lines.

- Attachment XI.D.3.c.(2a)-A contains copies of the recovery well material and lithology logs; and
- Figure XI.D.3.c.(2a)-2, sheets 4, 5, and 6 are cross-section along the south boundary recovery system alignment.

In September 1993 well RW-112 was installed in order to conduct aquifer tests to develop aquifer characteristics necessary for the preliminary design of a full system. In February 1994, a total of eight recovery wells (RWs-140 through 147) were installed along the southern and southeastern property boundary. The wells were brought on-line and recovery began. Following a little more than a year of production, it was determined that a more aggressive approach was required in the southeast corner of the property in order to recover a portion of the benzene plume that had already migrated offsite. In August 1995 well RW-170 was constructed to supplement the production in the area. During the 1995-1996 drought it was further determined that during dry years production rate to radius of capture ratio could not be maintained since the wells tended to dewater the aquifer in a localized area. It was due to this that an additional six recovery wells (RWs-194 through 199) were installed in locations between the existing wells. This allowed for maintaining an approximate 350-feet capture radius while minimizing the volumes required on a per well basis. This also allowed for a more definitive drawdown overlap during wet years while achieving the minimum capture necessary during dry years.

Figure XI.D.3.c.(2a)-3 is a map of the radial influence created by the production of the south boundary recovery wells. Also on the figure is the historical average production rates maintained by each of the 16 wells.

2.3 Class V Reinjection System

As discussed above, the Class V reinjection system is comprised of 14 reinjection wells in two lines oriented east-west downgradient of the phase-separated plume at the northern end of Refinery Lake. The wells inject treated ground water recovered from the South Boundary system.

- Attachment XI.D.3.c.(2a)-A contains copies of the recovery well material and lithology logs; and
- Figure XI.D.3.c.(2a)-2, sheets 2 and 3 are cross-section along the reinjection system alignments.

About a year following the installation and beginning of production of the south boundary wells in February 1994, it was discovered that the rate of migration of the phase-separated hydrocarbon

located south of IH-20 and approximately 2500-feet upgradient of the south boundary system increased by about 40%. It was determined that the linear sink created by the production of the south boundary system was, as designed, causing increased flow upgradient but well beyond the 1500-feet distance calculated and modeled in the original design. It was for this reason that a Class V permit was obtained and the 14 re-injection wells (RIWs-200 through 213) were installed in October 1996. The system receives groundwater recovered from the south boundary system, removes the volatile organics through air-stripping, and reinjects it through gravity-feed along the reinjection system. This system maintains a sufficient mounding of the groundwater to prevent downgradient migration of the phase-separated hydrocarbon while helping flush the dissolve-phase plume downgradient towards the south boundary system. Another advantage of the reinjection line is that as the LNAPL flow is stopped as it encounters the mound making the LNAPL to "stack" against the mound allowing for faster and more complete removal via the LNAPL stripper recovery wells north of the mound.

Figure XI.D.3.c.(2a)-3 is a map of the radial area of mounding created by the reinjection of treated groundwater in the Class V system. Also on the figure is the historical average injection rates maintained by each of the 14 wells.

2.4 PSH Recovery System

As discussed above, the PSH recovery system is comprised of 16 wells located in a rough grid pattern throughout the PSH plume located north and south of IH-20.

- Attachment XI.D.3.c.(2a)-A contains copies of the recovery well material and lithology logs.

In August 1992, well RW-106 was installed in order to conduct dual-phase aquifer tests and to pilot test different recovery tools to develop aquifer characteristics necessary for the preliminary design of a full system. In September and October 1995, an additional 15 wells (RWs-171 through 185 and 192) were installed. The wells were designed to provide options for recovery. Through the years since the system began operation, it has been determined that dual-phase recovery is the most effective way of recovering the LNAPL. A minimal amount of groundwater is produced in select wells (which change with changing conditions) while producing the LNAPL off the top of the groundwater. Although the radius of influence is measured in tens of feet, the object has been to be aggressive in the thickest parts of the plumes which has resulted in tremendous reduction of LNAPL mass with minimal change in the plume area. Once the mobil hydrocarbons have been removed, the area of the plume will rapidly reduce due to microbial action and other attenuation processes.

2.5 Historic Results

The following are the results of the current recovery system:

SYSTEM	Groundwater Recovered & Treated or Treated & Injected	LNAPL Recovered & Recycled	Plume Mass Changes	Plume Area Changes
South Boundary Dissolved-Phase System	22,099,362 bbls	na	Benzene Plume: (1994) 45,511 lbs (2023) 85 lbs	Benzene Plume: *Upper Sands* (1994) 490 ac (2010) 14 ac *Lower Gravels:* (1994) 775 ac (2010) 44 ac
PSH Recovery System	465,661 bbls	257,313 bbls	LNAPL Plume: (1994) 17,670,277 bbls (2023) 887,301 bbls	LNAPL Plume: (1994) 348 ac (2023) 282 ac
Class V Reinjection System	21,783,867 bbls	na	na	na

SECTION 3 COLLECTION AND TREATMENT SYSTEM DESIGN

3.1 Introduction

The following Section will discuss the design of the current collection and treatment system components. The original treatment was by a Nitrogen stripper located north of IH-20. This system was destroyed in the February 2008 explosion which also destroyed most of units in the area. The original system has been replaced with air-strippers located south of IH-20 near the injection surge tank. Figure XI.D.3.c.(2a) – 5 depicts the current system as constructed at the facility.

3.2 Piping Layout

South Boundary Dissolved-Phase Groundwater Recovery System – Below-grade 4-inch, steel collection piping runs the length of the South Boundary system (see Figure XI.D.3.c.(2) – 5) with 2-inch header pipes running from the collection pipe to each individual wells production pipe. Water production is metered at each well-head. The piping has two system separation valves that were originally installed for possible future use depending on impact conditions. One valve is located at the northeast end of the South Boundary collection pipe (near well RW-147) and acts to separated the South Boundary collection piping from the reinjection distribution piping. This valve remains closed. The second valve segregates the south boundary collection piping system and is located between wells RWs-144 and 196. This valve was installed for future use if either the western or eastern ends of the system were no longer impacted and part of the system could be removed from production. The location of the valve was based on analytical results at the time of the system installation. This valve remains open so that the entire system can be producted.
The South Boundary collection pipe is tied-in to the routing pipe at a location between wells RWs-196 and 143. The recovered groundwater is routed to the collection tank 73TK-001 in order to use booster pumps to further route the groundwater up the hill to the treatment system. From Tank 73TK-001, the water is routed along the western edge of Refinery Lake to the air strippers located north of the lake where it is treated prior to reinjection in the Class V reinjection system.

Class V Reinjection System – Following treatment in the air-strippers, the now treated groundwater is pumped via a subgrade 4-inch PVC pipe to the injection surge tank 73TK-013. From the injection surge tank the water is pumped into the reinjection distribution pipe system which runs the length of the 14 Class V reinjection wells. A header pipe is connected from the distribution pipe to each of the reinjection wells injection pipe where the water is gravity-fed into the wells. Water feed is metered at each well-head.

PSH Recovery System – The PSH recovery system is divided into two parts. First are the recovery wells located north of IH-20 which have skimmer-only pumps which produce only LNAPL which is collected in a local tank and removed to the slop oil system via vacuum truck. Second are the wells south of IH-20 which have LNAPL produced along with small volumes of groundwater. These wells are tied into a 4-inch steel collection pipe via a header pipe and the mixed fluid is pumped to a PSH separation tank (Tank 73TK-0112) for gravity separation. The phased PSH is then collected and removed to the slop oil tank via vacuum truck while the separated groundwater is pumped via a 2-inch steel pipe to the air stripper system. Following treatment in the air-strippers, the now treated groundwater is pumped via a subgrade 4-inch PVC pipe to the injection surge tank 73TK-013.

3.3 Treatment

The recovered groundwater is treated in a LP series cascade air stripper manufactured by MK Environmental Inc. The stripper utilizes forced-air at 180 CFM to remove the volatile organics and the air is then passed through a carbon bed before release. The system is rated to work at 150 gpm but is equipped with an infinite turn down flow system which allows peak performance at any volume less than the design rate. The general or targeted operational volume is 120 gpm which is maintained dependent on flow retention in tanks 73TK-001 and 73TK-0112. Attachment XI.D.3.c.(2a)-B contains the product specifications for the stripper units.

SECTION 4 RECOVERY SYSTEM WELL INSTALLATION

It is not anticipated that additional wells will be required for any of the remediation systems now in-place and producing. Since the system currently in place has proven effective over the last 20 to 26 years of production, should replacement wells be deemed necessary, the installations will be as close a replica of the original well as possible and within 20-feet of the original location. However, should new wells be necessary, the remediation wells will be installed utilizing the following guidelines.

4.1 Drilling Method

All wells will be drilled utilizing an air-rotary rig with minimum potable water mist and wet-rotary utilizing potable water only without mud or polymer additives.

4.2 Procedures

4.2.1 Well Site Preparation

Prior to the drilling and installation of any proposed remediation wells, the following procedures will be conducted to insure utility clearance and the installation of the surface sleeve:

1. The proposed locations will be staked in the field and will be outside any known easement right-of-way for buried pipelines, conduits, or cables and overhead power and telephone lines.
2. A survey for buried utilities will be conducted by Alon and will include a review of easement plats and the performance of a magnetic survey of the immediate area (i.e., buried line locator).
3. Within 10 days of the start of drilling, One-Call will be contacted by Alon or their representative in order to get utility identification and marking.

Following clearance of the locations, the driller will install a 5-feet long steel surface sleeve with an internal diameter of a minimum of 4-inches greater than the well outer diameter and cement the sleeve in-place.

4.2.2 Well Screen Configuration

Each well will be drilled to a depth no less than 15-feet into the Dockum red-bed clay to ensure that the formation has been identified. Once the lithologic conditions are known, a decision will be made in the field as to the screening intervals. The screening strategies are as follows:

South Boundary Dissolved-Phase Recovery	Upper Screen – 5 to 10-ft above top of saturation to 5-ft above top of basal gravel
	Lower Screen – Top of Basal Gravel to Top of Dockum Clay
PSH Recovery	Minimum of 5-ft above top of saturation to 5-ft below top of saturation

Re-Injection System	Minimum of 5-ft above top of saturation to top of Dockum Clay

4.2.3 Drilling and Sampling

The following drilling and sampling methods will be used for the installation of the recovery wells:

1. A minimum four-inch (4") borehole will be advanced using an air-rotary method with minimal potable water mist until the top of saturation is determined.
2. Following determination of the top of saturation, a potable water drilling fluid (with no drilling mud or other additives) can be used to advance the borehole.
3. Once the top of the basal gravel interval (if present) is determined and the Dockum Red Bed Formation is encountered, a "rat-hole" will be drilled to a depth dependent upon the competence and thickness of the overlying basal gravel and saturated sands.
4. Following completion of the four-inch (4") pilot hole, the borehole will be reamed to a minimum diameter of slightly less than the ID of the surface sleeve and the borehole cleaned. The borehole will be cleaned by circulating the drilling fluid until minimal cuttings are returned. The borehole will be logged based on cuttings and split-spoon samples collected every ten-feet (10'). All logging will be performed by the on-site geologist at the time of sample collection using the Unified Soil Classification System (USCS).

Attachment XI.D.3.c.(2a)-C contains the Well Boring Log that will be completed at the time of the drilling of each borehole.

4.2.4 Well Installation

The wells will be installed immediately after removal of the drill stem from the borehole using the methods describe below or their equivalent. A detailed listing of the type of materials that will be used for monitor well construction is compiled below.

1. During the assembly of each of the wells, a threaded sand point will be attached to the bottom joint of the screen. A stainless steel centralizer will be attached to the well casing approximately twelve-feet (12') above the top of the screened interval. The casing will then be assembled as it is lowered into the borehole to the proper depth.
2. After the casing and screen is in place and secured with a pipe vise, a 1.5-inch to 2-inch PVC threaded tremie pipe will be lowered into the annulus to a depth five-foot (5') above the uppermost screened interval. The filter pack material will be placed through the tremie pipe until the filter pack material is measured at three-feet (3') above the top of the screened interval. All measurements will be made with a weighted tape through the tremie pipe in order to prevent entanglement on the centralizer.
3. The tremie pipe will then be removed from the borehole and a bentonite pellet filter pack seal will be slowly poured into the annulus from the surface. After allowing approximately 15 minutes for the settling and initial swelling of the pellets, the tremie pipe will be re-placed into the annulus to maximum depth of ten-feet (10') above the top

of the target top of bentonite interval and a weighted tape will be lowered through the tremie pipe to determine the actual top of the bentonite seal. A minimum of three-feet (3') of bentonite seal must be in place. *Note: All Measurements Made With The Weighted Tape Will Be Referenced To Grade Surface Level.*

4. After allowing at least one hour for the filter pack seal (since time of placement) to further swell, the tremie pipe will be moved to a level no more than five-feet (5') above the top of the bentonite and a cement/bentonite grout will then be pumped through the tremie pipe to seal the annulus from the top of the bentonite to grade level (the tremie pipe will be raised in stages once the grout mixture is above the bottom of the tremie pipe). The cement/bentonite grout will be mixed in proportions of 80-pounds Portland Type I-II cement, 3.5-pounds of bentonite gel (or approximately 5% by weight) in sufficient potable water to create a 12 to 13 pounds per gallon mixture as determined by the driller using a mud weight scale. A steel protective casing will be centered over the well head with the top of the uncapped well flush with top shoulder of the protection casing. A minimum of 24-hours will be allowed for the annulus seal to cure and shrink before proceeding.
5. At the end of the curing period, any annulus resulting from curing will be filled with a grout mix as described above.
6. Following well development (discussed below), a six-feet by six-feet by six-inch (6' x 6' x 6") reinforced concrete surface seal diversion pad will then be formed and constructed centered around and sloping away from the well head. The diversion pad will be constructed two-inches (2") below and four-inches (4") above grade. The pads may be constructed following the completion of all wells if more than one is being installed.
7. Surveying and labeling of the wells will be the responsibility of Alon USA or their representative.

4.2.5 Well Development

Each well will be developed using an air-lift/water hammer method (or other approved method) utilizing an air compressor with an industrial air filter. Well development will be terminated when ALL the following three conditions, at a minimum, have been met:

1. A minimum of three times the original borehole volume of groundwater has been removed from the well;
2. The specific conductance and pH of the ground water has stabilized over a one borehole volume removal period (5% deviation for specific conductance and 0.1 standard units for pH (it should be noted that if LNAPL is also being produced, field measurements will not be made to protect the instruments); and
3. The groundwater has become free of silt and sand.

Attachment XI.D.3.c.(2a)-C contains the well development log which will be completed during the well development.

It is the responsibility of the driller that all drilling fluids and development water will be captured in 55-gallon drums or other appropriate container. Alon USA will arrange for a vacuum truck to remove the water following completion of the project. All cuttings will be stored on and covered by plastic sheeting for removal by Alon USA following completion of the project.

4.2.6 Decontamination

Following completion of each well (and/or prior to entry into a new borehole/well), all drill stem, drill bits, sampling tools, tremie pipe and other down-hole tools as well as the drilling rig will be steam-cleaned. Alon will provide access to a high-pressure steam cleaner and decontamination area (i.e., the facility wash pad). The driller is responsible for all decontamination labor. All necessary efforts will be made not to track mud onto public or private roads. If needed, the driller will be responsible for the removal of any mud left on roadways.

4.3 Well Acceptance

After each well has been installed and developed and all surface work is completed, a 5-feet long pipe of a diameter equal to 50 to 60% of the internal diameter of the well will be lowered down the well to the bottom in order to assure plumbness, accessibility, and effective development. After Alon is satisfied as to the installation and development quality, the well will be accepted.

4.4 Well Materials

Table XI.D.3.c.(2a)-3 is a summary of the well materials and other specifications to be utilized in the installation of each of the remediation well systems.

4.5 Production and Injection Settings

The following is guidance for pump and injection pipe settings for each of the remediation well systems. Specifics concerning materials and recommended pumps can be found in Table XI.D.3.c.(2a)-3.

South Boundary Dissolved-Phase Recovery – Each of the South Boundary recovery wells are constructed with a 5-feet blank casing interval both between the upper and lower screen and set at the sand-basal gravel interface. The pump intake will be located within this casing section. This is to prevent channeling of the filter pack and unconsolidated sediments during peak production rates. The blank casing disperses the in-flow velocity along the screened segments. The location of the blank casing at the sand-gravel interface also allows for maximizing the rates of production should higher rates be required.

LNAPL Recovery System – The setting of the production pump(s) are variable depending on the level and thickness of the LNAPL identified at any given time. Due to this, the pump(s) are set on wenches that allow for quick adjustment of pump intake levels. Currently a single pump per well is utilized for either LNAPL-only skimming or LNAPL and water total fluid production. The system is designed to also allow for dual-pump production of LNAPL and water separately.

Class V Reinjection System – The injected water is gravity fed into the wells through 2-inch injection pipes. The outflow point of the injection pipes are located at a depth 10-feet below the level of natural saturation at the time the well was installed.

TABLES

Table XI.D.3.c(2a)-1	Summary of Groundwater Remediation System Well Completion Information and Well Materials
Table XI.D.3.c(2a)-2	Historic System Volumes Recovered, Treated and Re-Injected
Table XI.D.3.c(2a)-3	Summary of Well Materials & Specifications

Table XI.D.3.c.(2a)-1
Summary of Groundwater Remediation System Well Completion Information and Well Materials
ALON USA BIG SPRING REFINERY

WELL NUMBER	DATE DRILLED	ELEVATIONS Top of Casing (MSL)	Top of Pad (MSL)	Top of Grade (MSL)	FACILITY MAP LOCATION Texas State Plane Coordinate Grid System NORTHING	EASTING	Height of Riser Pipe (feet)	Total Depth Drilled (feet)	(MSL)	WELL SIZE & MATERIAL (in.)	n/a	Top Casing to Total Depth (in.)	SCREENED INTERVAL TOP SCREEN (BGL)	(MSL)	BOTTOM SCREEN (BGL)	(MSL)	TOP OF FILTER PACK (BGL)	(MSL)	TOP OF BENTONITE SEAL (BGL)	(MSL)
● DISSOLVED-PHASE GROUNDWATER RECOVERY WELLS (South Boundary)																				
RW-112	Sep-93	2387.48	2385.54	2385.54	237781.46	791370.45	1.9	60.0	2325.5	6	PVC	46.9	20.0 40.0	2365.5 2345.5	35.0 45.0	2350.5 2340.5	16.0	2369.5	12.0	2373.5
RW-140	Feb-94	2388.84	2386.02	2385.79	237849.14	791712.21	3.1	60.0	2325.8	6	PVC	45.1	12.0 37.0	2373.8 2348.8	32.0 42.0	2353.8 2343.8	8.0	2377.8	6.0	2379.8
RW-141	Feb-94	2406.25	2402.94	2402.71	237433.75	789813.28	3.5	80.0	2322.7	6	PVC	64.5	31.0 56.0	2371.7 2346.7	51.0 61.0	2351.7 2341.7	22.0	2380.7	20.0	2382.7
RW-142	Feb-94	2436.69	2432.09	2431.86	237654.52	790806.94	4.8	110.0	2321.9	6	PVC	94.8	60.0 85.0	2371.9 2346.9	80.0 90.0	2351.9 2341.9	55.0	2376.9	53.0	2378.9
RW-143	Feb-94	2441.83	2437.00	2436.77	238020.06	792459.81	5.1	120.0	2316.8	6	PVC	100.1	65.0 90.0	2371.8 2346.8	85.0 95.0	2351.8 2341.8	56.0	2380.8	54.0	2382.8
RW-144	Feb-94	2440.68	2438.49	2438.26	238215.72	793317.59	2.4	120.0	2318.3	6	PVC	99.4	62.0 87.0	2376.3 2351.3	82.0 97.0	2356.3 2341.3	56.0	2382.3	54.0	2384.3
RW-145	Feb-94	2431.88	2429.48	2429.25	238417.18	79203.28	2.6	100.0	2329.3	6	PVC	89.6	57.0 82.0	2372.3 2347.3	77.0 87.0	2352.3 2342.3	43.0	2386.3	41.0	2388.3
RW-146	Feb-94	2441.48	2438.09	2437.86	239130.98	794086.69	3.6	120.0	2317.9	6	PVC	104.6	66.0 96.0	2371.9 2341.9	91.0 101.0	2346.9 2336.9	61.0	2376.9	55.0	2382.9
RW-147	Feb-94	2448.40	2445.56	2445.33	239790.45	793936.21	3.1	120.0	2325.3	6	PVC	103.1	70.0 95.0	2375.3 2350.3	90.0 100.0	2355.3 2345.3	67.0	2378.3	61.0	2384.3
RW-170	Aug-95	2435.15	2433.15	2433.15	238799.20	794159.83	2.0	110.0	2323.2	6	PVC	97.5	60.5 85.5	2372.7 2347.7	80.5 95.5	2352.7 2337.7	56.0	2377.2	53.0	2380.2
RW-194	Oct-96	2441.86	2443.89	2441.50	239498.85	794005.02	0.4	120.0	2321.5	6	PVC	105.9	60.5 95.5	2381.0 2346.0	90.5 105.5	2351.0 2336.0	57.0	2384.5	51.5	2390.0
RW-195	Oct-96	2434.41	2432.42	2432.20	238360.17	793840.46	2.2	100.0	2332.2	6	PVC	97.2	55.0 90.0	2377.2 2342.2	85.0 95.0	2347.2 2337.2	48.0	2384.2	45.0	2387.2
RW-196	Oct-96	2440.73	2438.49	2438.00	238163.77	792920.51	2.7	120.0	2318.0	6	PVC	105.7	63.0 98.0	2375.0 2340.0	93.0 103.0	2345.0 2335.0	56.5	2381.5	54.0	2384.0
RW-197	Oct-96	2419.37	2417.70	2417.50	237968.16	792117.39	1.9	100.0	2317.5	6	PVC	83.9	47.0 67.0	2370.5 2350.5	62.0 82.0	2355.5 2335.5	41.0	2376.5	36.0	2381.5
RW-198	Oct-96	2433.13	2431.15	2430.80	237508.44	790200.29	2.3	100.0	2330.8	6	PVC	87.3	65.0 80.0	2365.8 2350.8	75.0 85.0	2355.8 2345.8	57.0	2373.8	54.0	2376.8
RW-199	Oct-96	2440.42	2420.13	2419.80	237741.69	791037.96	20.6	95.0	2324.8	6	PVC	97.6	47.0 72.0	2372.8 2347.8	67.0 77.0	2352.8 2342.8	36.0	2383.8	32.0	2387.8
● PHASE-SEPARATED HYDROCARBON RECOVERY WELLS																				
RW-106	Aug-92	2442.67	2440.58	2440.41	240132.80	791443.67	2.3	85.0	2355.4	6	PVC	87.3	50.0	2390.4	85.0	2355.4	42.0	2398.4	38.0	2402.4
RW-171	Sep-95	2460.79	2459.74	2459.49	240477.44	789515.33	1.3	115.0	2344.5	8	PVC	114.3	73.0	2386.5	113.0	2346.5	68.0	2391.5	63.5	2396.0
RW-173	Sep-95	2456.26	2455.52	2455.27	240644.83	791178.82	1.0	120.0	2335.3	8	PVC	103.0	62.0	2393.3	102.0	2353.3	51.0	2404.3	48.0	2407.3
RW-174	Sep-95	2454.49	2453.71	2453.46	240619.42	791499.78	1.0	100.0	2353.5	8	PVC	96.0	70.0	2383.5	95.0	2358.5	65.0	2388.5	62.0	2391.5
RW-175	Sep-95	2434.90	2434.03	2433.78	240652.34	791917.13	1.1	100.0	2333.8	8	PVC	89.1	48.0	2385.8	88.0	2345.8	43.0	2390.8	40.0	2393.8
RW-176	Sep-95	2445.46	2444.56	2444.31	240596.02	790719.90	1.2	103.0	2341.3	8	PVC	99.2	58.0	2386.3	98.0	2346.3	52.0	2392.3	49.0	2395.3
RW-177	Sep-95	2434.41	2433.35	2433.10	239920.38	791428.40	1.3	80.0	2353.1	8	PVC	79.3	48.0	2385.1	78.0	2355.1	43.0	2390.1	40.0	2393.1
RW-178	Sep-95	2437.65	2436.43	2436.18	240538.68	790328.53	1.5	95.0	2341.2	8	PVC	89.5	48.0	2388.2	88.0	2348.2	42.0	2394.2	39.0	2397.2
RW-179	Oct-95	2434.75	2433.75	2433.50	240641.63	792300.07	1.3	80.0	2353.5	8	PVC	74.3	43.0	2390.5	73.0	2360.5	36.0	2397.5	33.0	2400.5
RW-180	Oct-95	2456.72	2455.74	2455.49	241118.27	790803.46	1.2	100.0	2355.5	8	PVC	98.2	62.0	2393.5	97.0	2358.5	56.0	2399.5	53.0	2402.5
RW-181	Oct-95	2457.78	2456.95	2456.70	241476.20	790714.78	1.1	105.0	2351.7	8	PVC	99.1	68.0	2388.7	98.0	2358.7	61.0	2395.7	58.0	2398.7
RW-182	Oct-95	2455.20	2454.24	2453.99	241774.89	790639.98	1.2	182.0	2272.0	8	PVC	99.2	58.0	2396.0	98.0	2356.0	53.0	2401.0	50.0	2404.0
RW-183	Oct-95	2462.50	2461.70	2461.45	242153.91	790557.62	1.1	107.0	2354.5	8	PVC	99.1	58.0	2403.5	98.0	2363.5	53.0	2408.5	50.0	2411.5
RW-184	Oct-95	2461.00	2460.30	2460.05	241611.86	792267.26	0.9	106.0	2354.1	8	PVC	98.9	58.0	2402.1	98.0	2362.1	53.0	2407.1	50.0	2410.1
RW-185	Oct-95	2454.18	2453.49	2453.24	241106.84	791931.87	0.9	106.0	2347.2	8	PVC	98.9	58.0	2395.2	98.0	2355.2	50.0	2403.2	47.0	2406.2
RW-192	Oct-95	2461.05	2460.19	2459.94	240501.52	789968.54	1.1	110.0	2349.9	8	PVC	107.1	66.0	2393.9	106.0	2353.9	60.0	2399.9	57.0	2402.9

Table XI.D.3.c.(2a)-1
Summary of Groundwater Remediation System Well Completion Information and Well Materials
ALON USA BIG SPRING REFINERY

WELL NUMBER	DATE DRILLED	ELEVATIONS			FACILITY MAP LOCATION		Height of Riser Pipe	Total Depth Drilled		WELL SIZE & MATERIAL		Top Casing to Total Depth	SCREENED INTERVAL				TOP OF FILTER PACK		TOP OF BENTONITE SEAL	
		Top of Casing	Top of Pad	Top of Grade	Texas State Plane Coordinate Grid System								TOP SCREEN		BOTTOM SCREEN					
		(MSL)	(MSL)	(MSL)	NORTHING	EASTING	(feet)	(feet)	(MSL)	(in.)	n/a	(in.)	(BGL)	(MSL)	(BGL)	(MSL)	(BGL)	(MSL)	(BGL)	(MSL)
● **CLASS V TREATED GROUNDWATER RE-INJECTION WELLS**																				
RIW-200	Oct-96	2448.24	2446.55	2445.69	240000.27	793109.50	2.5	120.0	2325.7	8	PVC	105.6	57.0	2388.7	103.0	2342.7	48.5	2397.2	44.5	2401.2
RIW-201	Oct-96	2447.24	2445.11	2444.60	239620.45	793220.22	2.6	120.0	2324.6	8	PVC	106.6	63.5	2381.1	104.0	2340.6	57.8	2386.9	54.0	2390.6
RIW-202	Oct-96	2434.77	2432.81	2432.00	239498.80	792719.14	2.8	100.0	2332.0	8	PVC	93.8	50.5	2381.5	91.0	2341.0	44.0	2388.0	41.0	2391.0
RIW-203	Oct-96	2436.06	2433.70	2432.80	239969.80	792597.65	3.3	100.0	2332.8	8	PVC	93.3	44.0	2388.8	90.0	2342.8	37.0	2395.8	34.0	2398.8
RIW-204	Oct-96	2415.22	2412.78	2412.30	239378.60	792258.25	2.9	80.0	2332.3	8	PVC	72.9	29.5	2382.8	70.0	2342.3	24.0	2388.3	21.0	2391.3
RIW-205R	Jul-00	2414.37	2412.00	2411.70	239865.81	792100.76	2.7	80.0	2331.7	8	PVC	70.7	22.0	2389.7	68.0	2343.7	17.0	2394.7	14.0	2397.7
RIW-206	Oct-96	2421.96	2419.65	2419.10	239770.03	791600.21	2.9	95.0	2324.1	8	PVC	81.9	33.0	2386.1	79.0	2340.1	27.0	2392.1	22.0	2397.1
RIW-207	Oct-96	2419.57	2416.98	2416.60	239719.58	791350.12	3.0	80.0	2336.6	8	PVC	75.0	31.5	2385.1	72.0	2344.6	26.0	2390.6	22.5	2394.1
RIW-208	Oct-96	2415.74	2413.17	2412.50	239674.99	791103.52	3.2	80.0	2332.5	8	PVC	72.2	23.0	2389.5	69.0	2343.5	18.0	2394.5	14.5	2398.0
RIW-209	Oct-96	2428.66	2426.48	2425.30	239550.16	790603.77	3.4	100.0	2325.3	8	PVC	88.4	39.0	2386.3	85.0	2340.3	34.0	2391.3	31.0	2394.3
RIW-210	Oct-96	2422.86	2421.01	2420.50	239200.28	790997.96	2.4	90.0	2330.5	8	PVC	80.4	36.5	2384.0	78.0	2342.5	31.0	2389.5	28.0	2392.5
RIW-211	Oct-96	2448.11	2446.08	2445.50	239051.02	790541.02	2.6	120.0	2325.5	8	PVC	102.6	59.0	2386.5	100.0	2345.5	47.0	2398.5	44.0	2401.5
RIW-212	Oct-96	2453.89	2451.44	2450.90	239440.88	790109.85	3.0	120.0	2330.9	8	PVC	111.0	46.5	2404.4	108.0	2342.9	54.0	2396.9	50.5	2400.4
RIW-213	Oct-96	2456.26	2453.76	2453.30	239301.75	789629.88	3.0	120.0	2333.3	8	PVC	113.0	69.0	2384.3	110.0	2343.3	63.0	2390.3	60.0	2393.3

TABLE XI.D.3.c(2a)-2

Historic System Volumes Recovered, Treated and Re-Injected

Alon USA Big Spring Refinery - CP-50140

Calendar Month	South Boundary System		Dual-Phase System					Reinjection System	
	Groundwater		Groundwater		RATIO OF OIL to	Hydrocarbons		Treated Water	
	(bbls)	(bbls/day	(bbls)	(bbls/day		(bbls)	(bbls/day	(bbls)	(bbls/day
Jun-94	44,222	1,474	0.0	0.00	na	81.36	2.71	40,684	1,356
Jul-94	48,266	1,609	0.0	0.00	na	126.11	4.20	45,370	1,512
Aug-94	86,388	2,880	0.0	0.00	na	69.86	2.33	78,613	2,620
Sep-94	62,859	2,095	0.0	0.00	na	79.43	2.65	60,973	2,032
Oct-94	49,670	1,656	0.0	0.00	na	77.05	2.57	47,683	1,589
Nov-94	106,831	3,561	0.0	0.00	na	44.43	1.48	103,626	3,454
Dec-94	48,703	1,623	0.0	0.00	na	39.00	1.30	45,294	1,510
Jan-95	93,586	3,120	0.0	0.00	na	39.64	1.32	86,099	2,870
Feb-95	57,266	1,909	0.0	0.00	na	205.88	6.86	53,830	1,794
Mar-95	55,968	1,866	0.0	0.00	na	710.74	23.69	50,931	1,698
Apr-95	54,165	1,806	0.0	0.00	na	529.98	17.67	52,540	1,751
May-95	36,204	1,207	0.0	0.00	na	364.93	12.16	34,756	1,159
Jun-95	39,861	1,329	0.0	0.00	na	621.19	20.71	38,665	1,289
Jul-95	86,916	2,897	0.0	0.00	na	382.05	12.73	80,832	2,694
Aug-95	76,557	2,552	0.0	0.00	na	499.40	16.65	70,432	2,348
Sep-95	65,354	2,178	0.0	0.00	na	162.00	5.40	61,433	2,048
Oct-95	36,911	1,230	0.0	0.00	na	271.00	9.03	33,589	1,120
Nov-95	45,986	1,533	0.0	0.00	na	263.50	8.78	44,606	1,487
Dec-95	29,067	969	0.0	0.00	na	587.00	19.57	27,904	930
Jan-96	70,320	2,344	NOT IN SERVICE		na	244.50	8.15	68,210	2,274
Feb-96	29,539	985	294.0	9.80	1.492	438.60	14.62	27,471	916
Mar-96	30,564	1,019	0.0	0.00	na	308.70	10.29	28,119	937
Apr-96	29,526	984	2,381.0	79.37	0.309	735.80	24.53	27,754	925
May-96	4,959	165	8,258.0	275.27	0.064	527.00	17.57	4,513	150
Jun-96	42,390	1,413	14,344.0	478.13	0.033	478.50	15.95	41,118	1,371
Jul-96	37,866	1,262	9,739.0	324.63	0.019	182.20	6.07	36,351	1,212
Aug-96	32,505	1,084	12,087.0	402.90	0.013	162.00	5.40	31,530	1,051
Sep-96	19,502	650	8,552.0	285.07	0.017	143.00	4.77	18,137	605
Oct-96	108,904	3,630	10,087.0	336.23	0.008	81.00	2.70	100,192	3,340
Nov-96	56,952	1,898	13,853.0	461.77	0.002	22.00	0.73	53,535	1,784
Dec-96	14,707	490	6,398.0	213.27	0.004	24.00	0.80	6,375	212
Jan-97	160,423	5,347	0.0	0.00	na	66.00	2.20	120,152	4,005
Feb-97	109,382	3,646	0.0	0.00	na	110.00	3.67	78,846	2,628
Mar-97	159,520	5,317	0.0	0.00	na	131.00	4.37	94,986	3,166
Apr-97	24,764	825	0.0	0.00	na	86.00	2.87	130,262	4,342
May-97	81,990	2,733	0.0	0.00	na	201.00	6.70	143,063	4,769
Jun-97	458,632	15,288	0.0	0.00	na	179.00	5.97	413,885	13,796
Jul-97	254,382	8,479	0.0	0.00	na	261.90	8.73	223,581	7,453
Aug-97	185,004	6,167	0.0	0.00	na	414.72	13.82	152,111	5,070
Sep-97	124,344	4,145	0.0	0.00	na	302.85	10.09	122,106	4,070
Oct-97	113,451	3,782	0.0	0.00	na	746.95	24.90	172,299	5,743
Nov-97	738,384	24,613	0.0	0.00	na	618.51	20.62	190,256	6,342
Dec-97	178,836	5,961	0.0	0.00	na	491.94	16.40	129,635	4,321
Jan-98	63,271	2,109	2,240.0	74.67	0.142	318.67	10.62	507,911	16,930
Feb-98	131,906	4,397	8,960.0	298.67	0.014	126.56	4.22	165,686	5,523
Mar-98	334,257	11,142	11,872.0	395.73	0.033	386.10	12.87	131,829	4,394

TABLE XI.D.3.c(2a)-2

Historic System Volumes Recovered, Treated and Re-Injected

Alon USA Big Spring Refinery - CP-50140

Calendar Month	South Boundary System		Dual-Phase System					Reinjection System	
	Groundwater		Groundwater		RATIO OF OIL to	Hydrocarbons		Treated Water	
	(bbls)	(bbls/day	(bbls)	(bbls/day		(bbls)	(bbls/day	(bbls)	(bbls/day
Apr-98	80,252	2,675	6,774.3	225.81	0.079	532.53	17.75	49,784	1,659
May-98	17,560	585	3,382.0	112.73	0.093	315.62	10.52	43,685	1,456
Jun-98	215,315	7,177	7,105.0	236.83	0.219	1554.18	51.81	135,907	4,530
Jul-98	100,425	3,348	4,999.5	166.65	0.268	1339.17	44.64	108,975	3,632
Aug-98	98,314	3,277	2,336.3	77.88	0.268	625.66	20.86	106,772	3,559
Sep-98	150,024	5,001	814.1	27.14	2.036	1657.39	55.25	354,700	11,823
Oct-98	195,657	6,522	9,058.4	301.95	0.235	2133.13	71.10	243,573	8,119
Nov-98	115,027	3,834	2,718.5	90.62	0.509	1382.79	46.09	112,519	3,751
Dec-98	167,203	5,573	13,500.8	450.03	0.107	1442.79	48.09	140,375	4,679
Jan-99	140,387	4,680	10,055.0	335.17	0.250	2510.73	83.69	137,031	4,568
Feb-99	127,804	4,260	2,938.0	97.93	0.570	1674.53	55.82	142,807	4,760
Mar-99	126,676	4,223	3,306.0	110.20	0.482	1594.93	53.16	118,209	3,940
Apr-99	167,832	5,594	9,175.0	305.83	0.195	1793.37	59.78	147,710	4,924
May-99	174,984	5,833	16,690.0	556.33	0.100	1670.34	55.68	185,838	6,195
Jun-99	179,598	5,987	21,444.7	714.82	0.117	2505.08	83.50	168,972	5,632
Jul-99	228,661	7,622	24,097.0	803.23	0.172	4143.35	138.11	205,141	6,838
Aug-99	214,904	7,163	2,257.0	75.23	1.459	3292.17	109.74	164,308	5,477
Sep-99	184,978	6,166	5,475.0	182.50	0.239	1307.08	43.57	165,010	5,500
Oct-99	176,565	5,886	15,167.0	505.57	0.101	1525.55	50.85	147,086	4,903
Nov-99	119,097	3,970	6,182.0	206.07	0.456	2817.63	93.92	128,748	4,292
Dec-99	224,581	7,486	7,632.3	254.41	0.514	3924.27	130.81	111,001	3,700
Jan-00	284,412	9,480	6,858.0	228.60	0.168	1150.75	38.36	219,418	7,314
Feb-00	144,192	4,806	3,728.0	124.27	0.640	2387.21	79.57	186,009	6,200
Mar-00	213,581	7,119	8,203.9	273.46	0.464	3805.18	126.84	259,291	8,643
Apr-00	143,438	4,781	7,497.1	249.90	0.230	1724.92	57.50	157,252	5,242
May-00	121,254	4,042	6,355.3	211.84	0.136	861.66	28.72	129,081	4,303
Jun-00	158,673	5,289	7,413.8	247.13	0.210	1557.50	51.92	205,271	6,842
Jul-00	181,049	6,035	2,091.7	69.72	0.684	1430.25	47.67	283,227	9,441
Aug-00	195,886	6,530	878.0	29.27	2.480	2177.65	72.59	245,525	8,184
Sep-00	195,250	6,508	7,578.3	252.61	0.259	1960.61	65.35	254,957	8,499
Oct-00	152,964	5,099	1,568.3	52.28	1.742	2731.85	91.06	194,791	6,493
Nov-00	142,834	4,761	229.1	7.64	5.672	1299.81	43.33	173,849	5,795
Dec-00	141,899	4,730	0.0	0.00	na	1401.85	46.73	203,333	6,778
Jan-01	20,902	697	0.1	0.00	5380.548	768.65	25.62	110,879	3,696
Feb-01	14,460	482	0.0	0.00	na	490.48	16.35	100,112	3,337
Mar-01	23,714	790	2,732.3	91.08	0.245	669.88	22.33	170,860	5,695
Apr-01	26,396	880	184.0	6.13	0.453	83.40	2.78	137,857	4,595
May-01	21,052	702	0.0	0.00	na	193.86	6.46	130,695	4,356
Jun-01	21,009	700	0.0	0.00	na	164.68	5.49	196,421	6,547
Jul-01	19,844	661	0.0	0.00	na	309.51	10.32	184,642	6,155
Aug-01	22,338	745	0.0	0.00	na	751.00	25.03	184,801	6,160
Sep-01	16,314	544	1,198.0	39.93	0.650	779.15	25.97	141,888	4,730
Oct-01	19,798	660	539.3	17.98	1.615	871.05	29.03	133,148	4,438
Nov-01	22,405	747	722.0	24.07	0.992	715.96	23.87	149,244	4,975
Dec-01	17,181	573	2,083.0	69.43	0.180	375.03	12.50	122,587	4,086

TABLE XI.D.3.c(2a)-2

Historic System Volumes Recovered, Treated and Re-Injected

Alon USA Big Spring Refinery - CP-50140

Calendar Month	South Boundary System		Dual-Phase System					Reinjection System	
	Groundwater		Groundwater		RATIO OF OIL to	Hydrocarbons		Treated Water	
	(bbls)	(bbls/day	(bbls)	(bbls/day		(bbls)	(bbls/day	(bbls)	(bbls/day
Jan-02	123,329	4,111	0.0	0.00	na	28.84	0.96	115,357	3,845
Feb-02	141,997	4,733	502.9	16.76	0.954	479.52	15.98	155,261	5,175
Mar-02	229,419	7,647	442.9	14.76	2.295	1016.45	33.88	211,562	7,052
Apr-02	225,207	7,507	664.8	22.16	0.444	295.36	9.85	175,250	5,842
May-02	242,652	8,088	29.0	0.97	38.943	1129.34	37.64	249,056	8,302
Jun-02	270,598	9,020	0.0	0.00	na	507.20	16.91	211,961	7,065
Jul-02	170,742	5,691	1,706.0	56.87	0.892	1521.58	50.72	178,280	5,943
Aug-02	179,825	5,994	16.3	0.54	38.807	632.56	21.09	181,835	6,061
Sep-02	93,909	3,130	2,853.9	95.13	0.000	0.00	0.00	133,631	4,454
Oct-02	118,483	3,949	4,990.0	166.33	0.201	1001.36	33.38	227,008	7,567
Nov-02	91,620	3,054	7,622.5	254.08	0.136	1039.43	34.65	122,691	4,090
Dec-02	112,511	3,750	0.0	0.00	na	794.97	26.50	201,611	6,720
Jan-03	78,820	2,627	0.0	0.00	na	1029.25	34.31	135,147	4,505
Feb-03	110,929	3,698	0.0	0.00	na	1028.25	34.27	96,973	3,232
Mar-03	111,174	3,706	0.0	0.00	na	1127.02	37.57	94,118	3,137
Apr-03	173,418	5,781	0.0	0.00	na	1756.16	58.54	128,316	4,277
May-03	90,978	3,033	0.0	0.00	na	3468.79	115.63	83,403	2,780
Jun-03	84,069	2,802	0.0	0.00	na	1523.79	50.79	100,152	3,338
Jul-03	126,784	4,226	276.3	9.21	6.618	1828.48	60.95	109,218	3,641
Aug-03	123,593	4,120	4,425.2	147.51	0.976	4320.92	144.03	101,915	3,397
Sep-03	214,709	7,157	953.5	31.78	0.471	448.62	14.95	179,252	5,975
Oct-03	196,098	6,537	1,525.1	50.84	0.977	1490.52	49.68	137,950	4,598
Nov-03	182,959	6,099	4,395.2	146.51	0.728	3198.87	106.63	115,270	3,842
Dec-03	142,782	4,759	3,567.0	118.90	0.652	2325.50	77.52	138,585	4,619
Jan-04	107,457	3,582	6,494.0	216.47	0.688	4468.62	148.95	87,090	2,903
Feb-04	105,434	3,514	5,623.9	187.46	0.753	4236.77	141.23	101,778	3,393
Mar-04	190,706	6,357	8,024.4	267.48	0.623	4996.27	166.54	160,796	5,360
Apr-04	138,475	4,616	4,138.8	137.96	0.628	2597.89	86.60	96,073	3,202
May-04	119,838	3,995	1,164.5	38.82	0.977	1137.57	37.92	108,199	3,607
Jun-04	150,980	5,033	1,382.4	46.08	0.956	1322.14	44.07	113,904	3,797
Jul-04	197,337	6,578	921.6	30.72	1.104	1017.79	33.93	148,418	4,947
Aug-04	188,133	6,271	1,493.0	49.77	0.843	1258.11	41.94	110,438	3,681
Sep-04	219,877	7,329	1,225.9	40.86	0.772	946.22	31.54	126,130	4,204
Oct-04	357,762	11,925	1,441.2	48.04	0.687	990.29	33.01	82,389	2,746
Nov-04	123,909	4,130	1,836.5	61.22	0.687	1261.87	42.06	117,109	3,904
Dec-04	113,183	3,773	1,381.5	46.05	0.687	949.23	31.64	77,429	2,581
Jan-05	479,375	15,979	2,004.0	66.80	0.471	943.58	31.45	132,763	4,425
Feb-05	57,251	1,908	776.0	25.87	0.808	627.17	20.91	42,105	1,403
Mar-05	110,937	3,698	1,097.0	36.57	0.803	881.43	29.38	104,419	3,481
Apr-05	66,316	2,211	1,977.0	65.90	0.317	627.17	20.91	89,448	2,982
May-05	69,899	2,330	2,061.0	68.70	0.282	581.97	19.40	64,768	2,159
Jun-05	42,417	1,414	2,123.5	70.78	0.258	548.07	18.27	64,112	2,137
Jul-05	38,329	1,278	540.0	18.00	0.947	511.34	17.04	37,603	1,253
Aug-05	101,513	3,384	0.0	0.00	na	64.04	2.13	131,720	4,391
Sep-05	98,416	3,281	939.0	31.30	1.215	1141.34	38.04	106,910	3,564
Oct-05	70,012	2,334	833.5	27.78	1.214	1012.14	33.74	119,745	3,991

TABLE XI.D.3.c(2a)-2

Historic System Volumes Recovered, Treated and Re-Injected

Alon USA Big Spring Refinery - CP-50140

Calendar Month	South Boundary System		Dual-Phase System					Reinjection System	
	Groundwater		Groundwater		RATIO OF OIL to	Hydrocarbons		Treated Water	
	(bbls)	(bbls/day	(bbls)	(bbls/day		(bbls)	(bbls/day	(bbls)	(bbls/day
Nov-05	117,369	3,912	205.9	6.86	3.019	621.52	20.72	230,196	7,673
Dec-05	102,995	3,433	1,116.8	37.23	1.240	1385.39	46.18	641,868	21,396
Jan-06	157,397	5,247	247.5	8.25	3.059	757.12	25.24	144,721	4,824
Feb-06	111,217	3,707	3,659.1	121.97	0.172	627.55	20.92	95,728	3,191
Mar-06	50,718	1,691	428.5	14.28	1.699	727.93	24.26	52,527	1,751
Apr-06	12,800	427	235.5	7.85	2.691	633.69	21.12	92,758	3,092
May-06	142,759	4,759	533.0	17.77	1.166	621.52	20.72	208,759	6,959
Jun-06	110,153	3,672	2,598.6	86.62	0.438	1138.51	37.95	80,606	2,687
Jul-06	93,951	3,132	468.1	15.60	1.865	873.15	29.11	78,455	2,615
Aug-06	251,083	8,369	384.8	12.83	2.042	785.87	26.20	308,938	10,298
Sep-06	166,684	5,556	976.3	32.54	0.954	930.87	31.03	65,711	2,190
Oct-06	172,189	5,740	877.7	29.26	0.954	837.64	27.92	104,804	3,493
Nov-06	223,796	7,460	40.5	1.35	3.767	152.55	5.09	133,568	4,452
Dec-06	84,422	2,814	1,035.5	34.52	1.053	1090.86	36.36	82,674	2,756
Jan-07	79,757	2,659	36.0	1.20	37.459	1348.51	44.95	40,741	1,358
Feb-07	89,663	2,989	72.0	2.40	29.967	2157.62	71.92	90,331	3,011
Mar-07	79,542	2,651	72.0	2.40	23.412	1685.64	56.19	107,734	3,591
Apr-07	182,052	6,068	72.0	2.40	26.368	1898.46	63.28	139,734	4,658
May-07	515,436	17,181	18.0	0.60	18.834	339.01	11.30	82,464	2,749
Jun-07	0	0	0.0	0.00	0.000	0.00	0.00	0	0
Jul-07	63,160	2,105	103.3	3.44	13.970	1443.06	48.10	11,164	372
Aug-07	60,990	2,033	159.6	5.32	7.628	1217.43	40.58	74,684	2,489
Sep-07	80,163	2,672	74.4	2.48	13.493	1003.85	33.46	79,821	2,661
Oct-07	88,895	2,963	68.2	2.27	10.295	702.13	23.40	79,208	2,640
Nov-07	80,410	2,680	33.7	1.12	22.411	755.24	25.17	71,578	2,386
Dec-07	90,800	3,027	29.7	0.99	16.627	493.83	16.46	83,726	2,791
Jan-08	93,368	3,112	90.3	3.01	9.190	829.82	27.66	82,859	2,762
Feb-08	54,103	1,803	14.0	0.47	38.475	538.65	17.96	137,254	4,575
Not In Service Due to Post- Explosion & Fire Rebuild [February 18, 2008 through January 10, 2014									
Jan-14	68,621	2,287	21.9	0.73	16.544	363.06	12.10	41,471	1,382.4
Feb-14	68,621	2,287	21.9	0.73	16.544	363.06	12.10	41,903	1,396.8
Mar-14	102,232	3,408	11.8	0.39	16.544	194.73	6.49	1,720	57.3
Apr-14	102,232	3,408	77.4	2.58	1.667	129.03	4.30	3,403	113.4
May-14	157,939	5,265	81.4	2.71	1.667	135.63	4.52	22,643	754.8
Jun-14	60,754	2,025	0.0	0.00	na	132.60	4.42	6	0.2
Jul-14	2,278	76	128.7	4.29	0.816	105.00	3.50	215	7.2
Aug-14	18,673	622	109.6	3.65	1.076	118.00	3.93	256	8.5
Sep-14	22,000	733	609.2	20.31	0.181	110.00	3.67	2,435	81.2
Oct-14	0	0	14.1	0.47	1.667	23.56	0.79	0	0.0
Nov-14	14,163	472	110.9	3.70	1.352	150.00	5.00	1,237	41.2
Dec-14	0	0	0.0	0.00	0.000	0.00	0.00	0	0.0
Jan-15	2,585	86	910.0	30.33	0.045	41.40	1.38	778	25.9
Feb-15	1,287	43	309.9	10.33	0.086	26.80	0.89	409	13.6
Mar-15	1,694	56	60.8	2.03	0.023	1.40	0.05	506	16.9

TABLE XI.D.3.c(2a)-2

Historic System Volumes Recovered, Treated and Re-Injected

Alon USA - Big Spring Refinery - CP-50140

Calendar Month	South Boundary System		Dual-Phase System					Reinjection System	
	Groundwater		Groundwater		RATIO OF OIL to	Hydrocarbons		Treated Water	
	(bbls)	(bbls/day	(bbls)	(bbls/day		(bbls)	(bbls/day	(bbls)	(bbls/day
Apr-15	2,598	87	31.8	1.06	0.006	0.20	0.01	860	28.7
May-15	2,002	67	130.6	4.35	0.224	29.30	0.98	0	0.0
Jun-15	1,329	44	0.0	0.00	na	50.00	1.67	2,789	93.0
Jul-15	0	0	70.2	2.34	0.045	3.19	0.11	0	0.0
Aug-15	880	29	165.7	5.52	0.086	14.33	0.48	0	0.0
Sep-15	4,936	165	193.7	6.46	0.023	4.46	0.15	0	0.0
Oct-15	9,444	315	239.7	7.99	0.006	1.51	0.05	8,710	290.3
Nov-15	14,364	479	327.8	10.93	0.224	73.54	2.45	11,119	370.6
Dec-15	7,879	263	116.5	3.88	5.451	634.89	21.16	8,006	266.9
Jan-16	10,143	338	328.5	10.95	1.497	491.65	16.39	7,895	263.2
Feb-16	16,120	537	404.7	13.49	1.735	702.20	23.41	14,516	483.9
Mar-16	18,982	633	599.9	20.00	1.574	944.03	31.47	19,444	648.1
Apr-16	10,143	338	91.3	3.04	11.815	1078.85	35.96	15,542	518.1
May-16	16,120	537	284.2	9.47	2.921	830.26	27.68	15,134	504.5
Jun-16	18,982	633	66.4	2.21	19.583	1300.70	43.36	17,342	578.1
Jul-16	13,954	465	1,077.8	35.93	0.854	920.09	30.67	17,718	590.6
Aug-16	22,197	740	84.1	2.80	22.458	1889.28	62.98	16,108	536.9
Sep-16	23,555	785	66.1	2.20	16.339	1079.51	35.98	7,230	241.0
Oct-16	16,942	565	248.1	8.27	3.656	906.84	30.23	11,788	392.9
Nov-16	22,696	757	341.5	11.38	3.661	1250.04	41.67	13,809	460.3
Dec-16	20,456	682	185.5	6.18	6.513	1208.29	40.28	10,716	357.2
Jan-17	20,019	667	160.1	5.34	8.606	1378.22	45.94	12,577	419.2
Feb-17	19,984	666	124.8	4.16	11.534	1439.83	47.99	9,276	309.2
Mar-17	27,690	923	367.4	12.25	3.950	1451.16	48.37	18,890	629.7
Apr-17	22,155	739	347.1	11.57	3.043	1056.36	35.21	14,633	487.8
May-17	29,243	975	519.0	17.30	2.217	1150.89	38.36	18,007	600.2
Jun-17	22,501	750	79.7	2.66	14.923	1188.93	39.63	14,999	500.0
Jul-17	21,884	729	89.9	3.00	12.364	1112.01	37.07	13,321	444.0
Aug-17	27,962	932	227.8	7.59	5.692	1296.84	43.23	19,110	637.0
Sep-17	19,802	660	59.0	1.97	17.851	1052.65	35.09	10,384	346.1
Oct-17	16,445	548	185.6	6.19	5.451	1011.96	33.73	13,117	437.2
Nov-17	19,139	638	80.8	2.69	15.334	1238.70	41.29	15,145	504.8
Dec-17	8,668	289	6.4	0.21	157.796	1006.74	33.56	5,713	190.4
Jan-18	8,498	283	0.0	0.00	na	1020.39	34.01	6,892	229.7
Feb-18	12,480	416	225.7	7.52	4.559	1028.85	34.30	7,593	253.1
Mar-18	21,588	720	379.7	12.66	2.802	1063.93	35.46	14,111	470.4
Apr-18	33,238	1,108	6.4	0.21	161.874	1037.83	34.59	14,588	486.3
May-18	41,463	1,382	9.6	0.32	157.745	1515.40	50.51	20,875	695.8
Jun-18	31,431	1,048	0.2	0.01	567.600	116.15	3.87	23,343	778.1
Jul-18	37,912	1,264	109.5	3.65	13.841	1514.87	50.50	13,727	457.6
Aug-18	28,173	939	236.9	7.90	6.848	1622.52	54.08	8,851	295.0

TABLE XI.D.3.c(2a)-2

Historic System Volumes Recovered, Treated and Re-Injected

Alon USA Big Spring Refinery - CP-50140

Calendar Month	South Boundary System		Dual-Phase System					Reinjection System	
	Groundwater		Groundwater		RATIO OF OIL to	Hydrocarbons		Treated Water	
	(bbls)	(bbls/day	(bbls)	(bbls/day		(bbls)	(bbls/day	(bbls)	(bbls/day
Sep-18	13,938	465	89.3	2.98	17.379	1551.60	51.72	7,211	240.4
Oct-18	17,100	570	102.5	3.42	14.878	1524.56	50.82	4,808	160.3
Nov-18	19,648	655	591.0	19.70	2.102	1242.40	41.41	7,534	251.1
Dec-18	5,290	176	269.7	8.99	4.412	1189.80	39.66	1,853	61.8
Jan-19	13,527	451	586.7	19.56	2.455	1440.33	48.01	4,449	148.3
Feb-19	9,209	307	450.7	15.02	2.867	1292.10	43.07	4,408	146.9
Mar-19	9,235	308	230.6	7.69	6.249	1441.00	48.03	3,812	127.1
Apr-19	14,226	474	243.8	8.13	5.416	1320.50	44.02	3,505	116.8
May-19	4,270	142	694.0	23.13	1.723	1196.00	39.87	2,354	78.5
Jun-19	4,229	141	511.4	17.05	2.061	1054.00	35.13	2,023	67.4
Jul-19	5,566	186	202.6	6.75	5.462	1106.50	36.88	1,343	44.8
Aug-19	6,771	226	474.5	15.82	2.060	977.60	32.59	1,515	50.5
Sep-19	3,607	120	106.7	3.56	9.360	998.70	33.29	3,891	129.7
Oct-19	4,527	151	242.0	8.07	5.146	1245.30	41.51	4,769	159.0
Nov-19	2,339	78	201.6	6.72	5.366	1081.80	36.06	3,674	122.5
Dec-19	2,355	79	351.9	11.73	3.121	1098.40	36.61	4,807	160.2
Jan-20	2,355	79	134.4	4.48	7.557	1015.60	33.85	4,968	165.6
Feb-20	1,336	45	505.1	16.84	1.919	969.30	32.31	2,289	76.3
Mar-20	1,104	37	414.9	13.83	2.586	1072.85	35.76	3,769	125.6
Apr-20	1,876	63	553.9	18.46	1.937	1072.90	35.76	3,718	123.9
May-20	1,355	45	297.5	9.92	3.102	922.80	30.76	3,169	105.6
Jun-20	3,125	104	272.8	9.09	3.328	907.90	30.26	5,740	191.3
Jul-20	4,652	155	87.5	2.92	11.353	993.40	33.11	4,241	141.4
Aug-20	6,333	211	57.1	1.90	16.102	919.40	30.65	5,563	185.4
Sep-20	7,506	250	38.0	1.27	27.416	1041.80	34.73	7,196	239.9
Oct-20	6,819	227	177.6	5.92	5.014	890.40	29.68	6,805	226.8
Nov-20	7,052	235	91	3.02	10.362	937.80	31.26	8,513	283.8
Dec-20	8,383	279	432.2	14.41	2.204	952.70	31.76	7,665	255.5
Jan-21	7,231	241	43.9	1.46	19.660	863.40	28.78	4,851	161.7
Feb-21	3,620	121	184.3	6.14	3.403	627.20	20.91	2,577	85.9
Mar-21	10,138	338	440.9	14.70	1.924	848.50	28.28	25,318	843.9
Apr-21	8,097	270	230.4	7.68	3.012	694.00	23.13	10,727	357.6
May-21	9,500	317	440.5	14.68	1.604	706.30	23.54	8,530	284.3
Jun-21	6,117	204	222.0	7.40	2.595	576.10	19.20	5,168	172.3
Jul-21	7,679	256	429.9	14.33	0.656	281.80	9.40	6,074	202.5
Aug-21	7,038	235	254.4	8.48	1.125	286.30	9.54	5,576	185.9
Sep-21	4,824	161	138.5	4.62	2.488	344.40	11.98	2,757	91.9
Oct-21	6,171	206	177.6	5.92	1.591	282.60	9.42	4,869	162.3
Nov-21	7,281	243	247	8.22	1.137	280.40	9.35	5,066	168.9
Dec-21	6,628	221	142.9	4.76	2.746	392.40	13.08	5,911	197.0

TABLE XI.D.3.c(2a)-2

Historic System Volumes Recovered, Treated and Re-Injected

Alon USA Big Spring Refinery - CP-50140

Calendar Month	South Boundary System		Dual-Phase System					Reinjection System	
	Groundwater		Groundwater		RATIO OF OIL to	Hydrocarbons		Treated Water	
	(bbls)	(bbls/day	(bbls)	(bbls/day		(bbls)	(bbls/day	(bbls)	(bbls/day
Jan-22	5,083	169	203.9	6.80	2.165	441.30	14.71	6,106	203.5
Feb-22	3,786	126	165.8	5.52	2.279	377.80	12.59	4,120	137.3
Mar-22	4,982	166	76.1	2.54	6.752	513.80	17.30	4,856	161.9
Apr-22	4,248	142	144.4	4.81	3.507	506.60	16.89	4,913	163.8
May-22	5,226	174	778.7	25.96	0.719	560.10	18.67	5,637	187.9
Jun-22	4,897	163	120.7	4.02	3.997	482.40	16.08	5,023	167.2
Jul-22	4,618	154	119.5	3.98	4.429	529.10	17.64	4,419	147
Aug-22	5,786	193	247.0	8.23	2.509	619.90	20.66	5,863	195
Sep-22	3,542	118	196.1	6.54	2.939	576.50	19.22	4,385	146
Oct-22	4,581	153	317.3	10.58	1.616	512.80	17.09	5,536	185
Nov-22	3,180	106	219	7.29	2.124	464.70	15.40	3,627	121
Dec-22	3,322	111	65.0	2.20	7.846	510.00	17.00	3,168	106
Jan-23	6,016	201	562.2	18.74	0.857	481.90	16.06	4,653	155.1
Feb-23	5,814	194	240.3	8.01	2.379	571.70	19.06	5,737	191.2
Mar-23	5,885	196	106.6	3.55	5.914	630.4	21.01	7,155	238.5
Apr-23	5,255	175	106.4	3.55	5.593	595.00	19.83	6,369	212.3
May-23	5,272	176	252.1	8.40	2.132	537.60	17.92	7,929	264.3
Jun-23	5,318	177	158.3	5.28	3.599	569.80	18.99	5,796	193.2
Jul-23	5,637	188	348.8	11.63	1.493	520.60	17.35	3,877	129
Pre-Rebuild	**20,387,782**	**2,418**	**439,133**	**89.25**	**0.390**	**171,058**	**34.56**	**20,408,641**	**2,421**
Post-Rebuild	**1,711,580**	**203**	**26,506**	**28**	**3.254**	**86,254**	**32**	**1,712,840**	**203**
Historic	**22,099,362**	**2,621**	**465,661**	**56**	**0.553**	**257,313**	**31**	**21,783,867**	**2,584**

NIR - Not In the Records

Table XI.D.3.c.(2a)-3
Summary of Well Materials & Specifications
Alon USA Big Spring Refinerey

Material	S. Boundary Recovery Wells	PSH Recovery Wells	Reinjection System Wells
Surface Sleeve	10-inch by 5-feet steel pipe	12-inch by 5-feet steel pipe	12-inch by 5-feet steel pipe
Pilot Hole	4-inch diameter	4-inch diameter	4-inch diameter
Borehole	8.5-inch diameter rotary bit	10.75-inch diameter rotary bit	10.75-inch diameter rotary bit
Well Casing	6-inch ID PVC, Schedule 40, Flush-threaded pipe	8-inch ID PVC, Schedule 40, Flush-threaded pipe	8-5/8 inch ID Steel, threaded and coupled pipe
Well Screen	6-inch ID PVC, Schedule 40, Flush-threaded pipe with 0.02-inch milled slots	8-inch ID PVC, Schedule 40, Flush-threaded pipe with 0.02-inch milled slots	8-5/8 inch ID Steel, threaded and coupled pipe with 0.02-inch milled-slots
Screen Divider Casing	6-inch ID PVC, Schedule 40, Flush-threaded pipe	not applicable	not applicable
Well Cap	6-inch by 1-inch sanitary well seal with 3-hole configuration	8-inch by 1-inch sanitary well seal with 3-hole configuration	Steel plate with 1-inch and 0.5-inch hole configuration
Well Bottom Plug	6-inch male-threaded PVC sand cone	8-inch male-threaded PVC sand cone	8-5/8 inch steel footer cap
Filter Pack	1:16 washed, pre-sieved, pure silica sand, subrounded	1:16 washed, pre-sieved, pure silica sand, subrounded	1:16 washed, pre-sieved, pure silica sand, subrounded
Filter Pack Seal	0.5-inch compressed pure-bentonite pellets	0.5-inch compressed pure-bentonite pellets	0.5-inch compressed pure-bentonite pellets
Surface Seal	Flexible cement grout mixed by a ratio of (by volume weight) 95% Type I-II Portland Cement to 5% bentonite gel in sufficient potable water to creae a 12 to 13 lbs/gallon grout mix	Flexible cement grout mixed by a ratio of (by volume weight) 95% Type I-II Portland Cement to 5% bentonite gel in sufficient potable water to creae a 12 to 13 lbs/gallon grout mix	Flexible cement grout mixed by a ratio of (by volume weight) 95% Type I-II Portland Cement to 5% bentonite gel in sufficient potable water to creae a 12 to 13 lbs/gallon grout mix
Centrailizer	6-feet by 6-feet by 6-inch sand-based cement with steel mesh reinforcement	6-feet by 6-feet by 6-inch sand-based cement with steel mesh reinforcement	6-feet by 6-feet by 6-inch sand-based cement with steel mesh reinforcement
Protective Casing	8-inch by 5-feet steel casing	10-inch by 5-feet steel casing	not applicable
Drop Pipe	1-inch steel, threaded and coupled	1-inch steel, threaded and coupled	2-inch steel pipe, threaded and coupled
Production Pump	Grundfos 40S50-15, 5-HP, 460 VPH submersible pump	Grundfos 5Redi-Flo3-90, 0.75 HP, 460 VPH submersible pump	not applicable

FIGURES

Figure XI.D.3.c(2a)-1 Recovery System Well Locations
Figure XI.D.3.c(2a)-2 Recovery System Cross-Sections
Figure XI.D.3.c(2a)-3 Radius of Influence for Producing and Re-Injection Wells
Figure XI.D.3.c(2a)-4 Recovery System Existing Collection and Treatment Layout

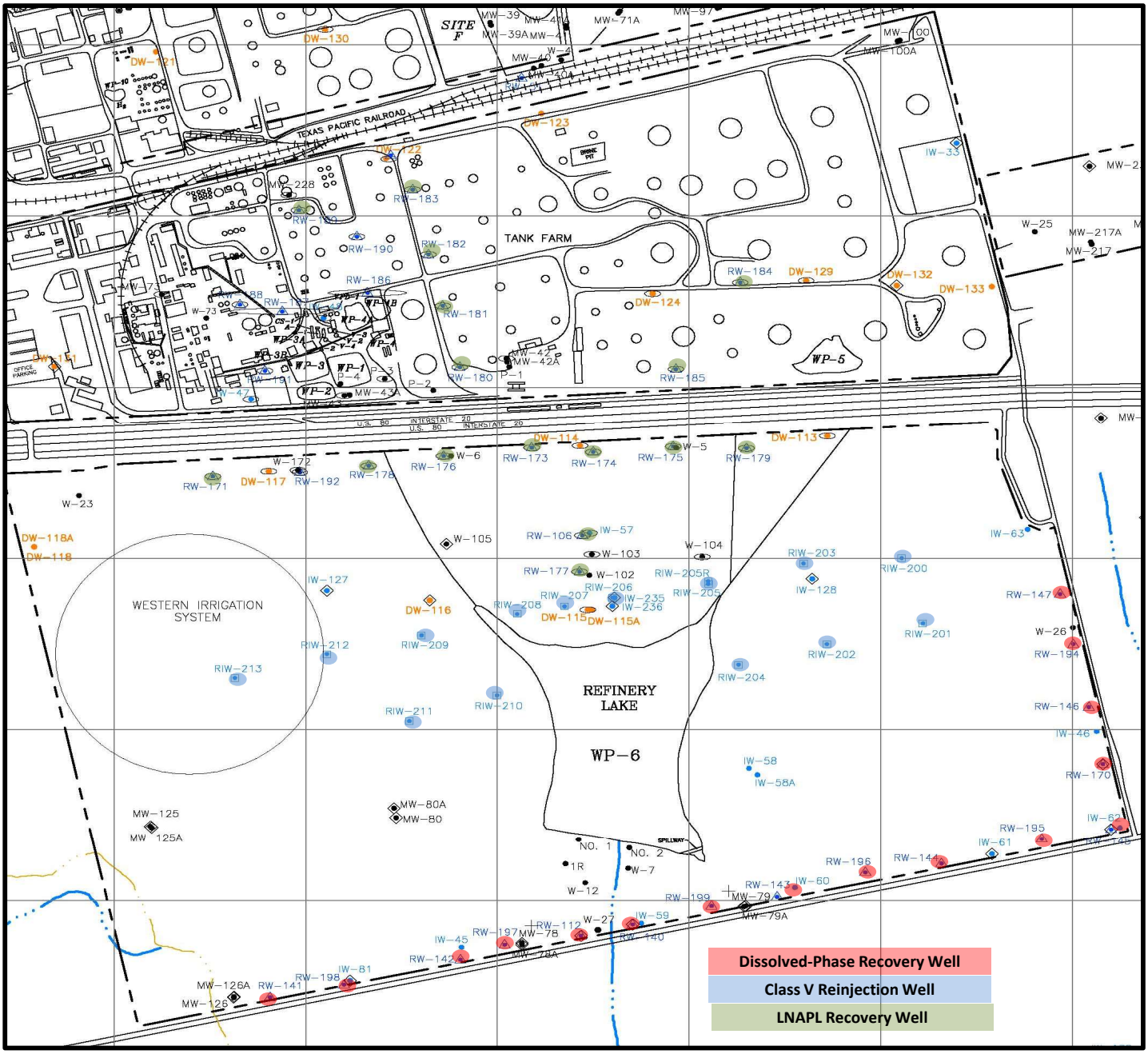


Figure No.	XI.D.3.c.(2a)-1
Sheet 1 of 1	
Facility	Big Spring Refinery
Owner	Alon USA LP

Figure Title

RECOVERY SYSTEM WELL LOCATIONS

ATLAS

September 23, 2023

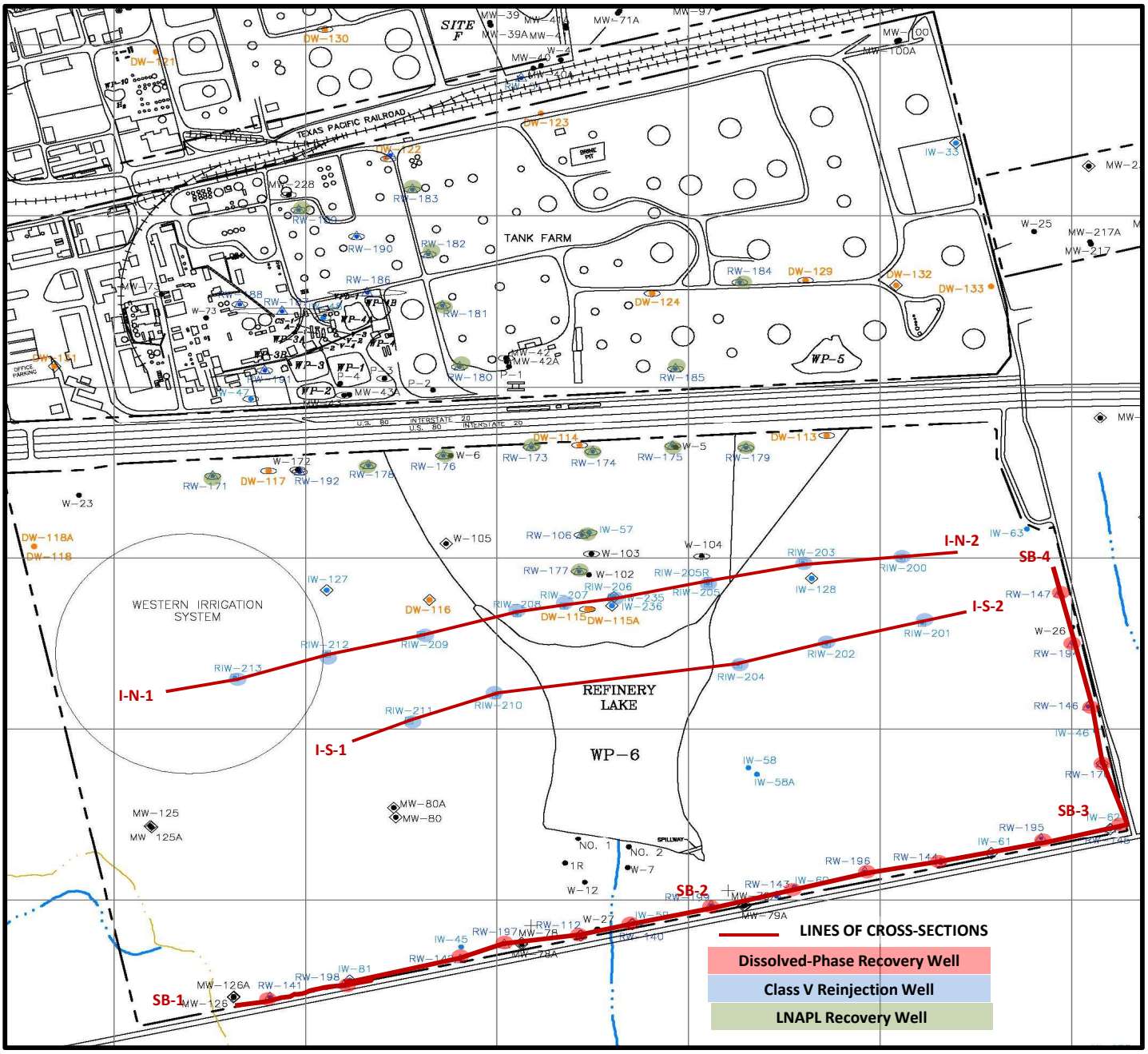


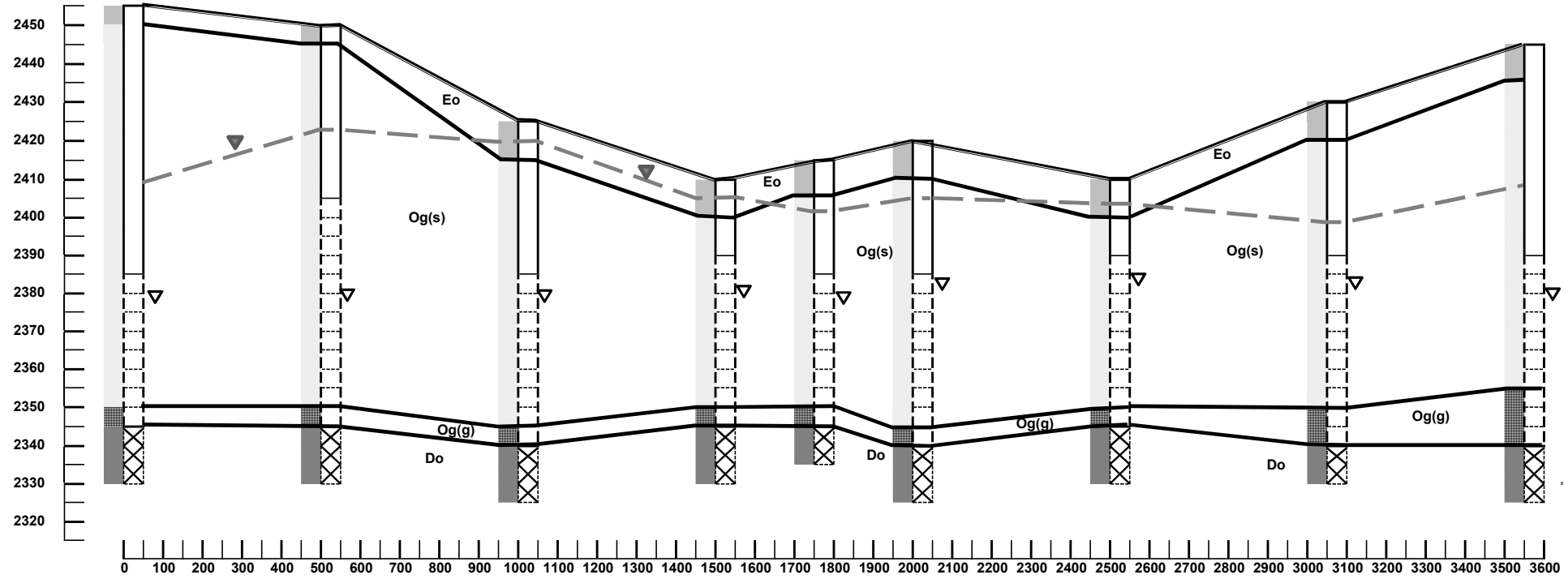
Figure No. XI.D.3.c.(2a)-2		Figure Title	
Sheet 1 of 6		RECOVERY SYSTEM CROSS-SECTIONS	
Facility	Big Spring Refinery		
Owner	Alon USA LP		September 23, 2023

Figure XI.D.3.c.(2a)-2

Cross-Section I-N-1 to I-N-2 - Northern Reinjection Line

Sheet 2 of 6

Reference Point:	I-N-1 (WEST)								I-N-2 (EAST)
Well No.	RIW-213	RIW-212	RIW-209	RIW-208	RIW-207	RIW-206	RIW-205R	RIW-203	RIW-200
Northing Grid Loc	239,302	239,441	239,550	239,675	239,720	239,770	239,866	239,970	240,000
Easting Grid Loc.	789,630	790,110	790,604	791,104	791,350	791,600	792,101	792,598	793,110
Top Casing (ft-msl)	2456.26	2453.89	2428.66	2415.74	2419.57	2421.96	2414.37	2436.06	2448.24
Top Grade (ft-msl)	2453.3	2450.9	2425.3	2412.5	2416.6	2419.1	2411.7	2432.8	2445.69
Date Drilled:	Oct-96	Oct-96	Oct-96	Oct-96	Oct-96	Oct-96	Jul-00	Oct-96	Oct-96
Top Saturation (ft-msl)	2377.3	2378.9	2377.3	2379.5	2377.6	2380.1	2382.7	2380.8	2378.69
Top Hydrocaron (Jan-2010)	na	na	na	na	na	na	na	na	na
Avg. Injection Rate (bbl/day)	518	356	353	325	315	422	481	601	793
Avg. Induced Water Level	2409.57	2423.30	2420.28	2411.43	2402.53	2405.85	2404.47	2399.85	2408.11



Formations & Lithology

Eo - Eolian windblown silt and sand

Og(s) - Ogallala formation upper sand unit

Og(g) - Ogallala formation basal gravel unit

Do - Dockum formation red-bed clay

SILT
SAND
GRAVEL
CLAY

Top of Saturation determined at Installation

Water Level July 2023

Plugged borehole below screen

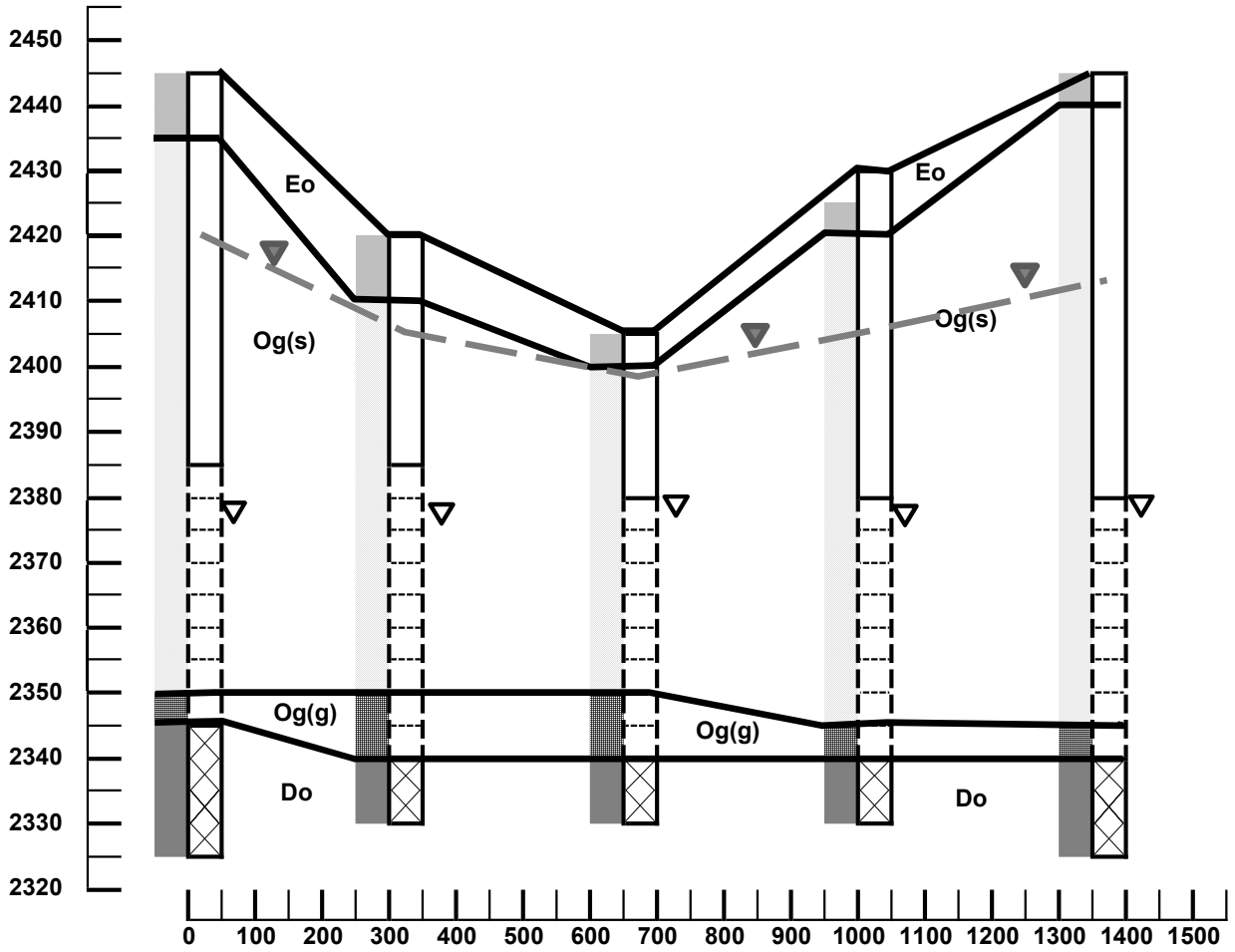
Screened Interval

Figure XI.D.3.c.(2a)-2

Cross-Section I-S-1 to I-S-2 - Southern Reinjection Line

Sheet 3 of 6

Reference Point:	I-S-1 (WEST)				I-S-2 (EAST)
Well No.	RIW-211	RIW-210	RIW-204	RIW-202	RIW-201
Northing Grid Loc	239,051	239,200	239,379	239,499	239,620
Easting Grid Loc.	790,541	790,998	792,258	792,719	793,220
Top Casing (ft-msl)	2448.11	2422.86	2415.22	2434.77	2434.77
Top Grade (ft-msl)	2445.5	2420.5	2412.3	2432	2432
Date Drilled:	Oct-96	Oct-96	Oct-96	Oct-96	Oct-96
Top Saturation (ft-msl)	2376.5	2376.5	2376.3	2375	2375.6
Top Hydrocaron (Jan-2010)	na	na	na	na	na
Avg. Injection Rate (bbl/day)	325	371	265	362	367
Avg. Induced Water Level	2420.45	2405.64	2399.96	2405.40	2413.80



Formations & Lithology

Eo - Eolian windblown silt and sand
Og(s) - Ogallala formation upper sand unit
Og(g) - Ogallala formation basal gravel unit
Do - Dockum formation red-bed clay
Top of Saturation determined at Installation
Water Level July 2023

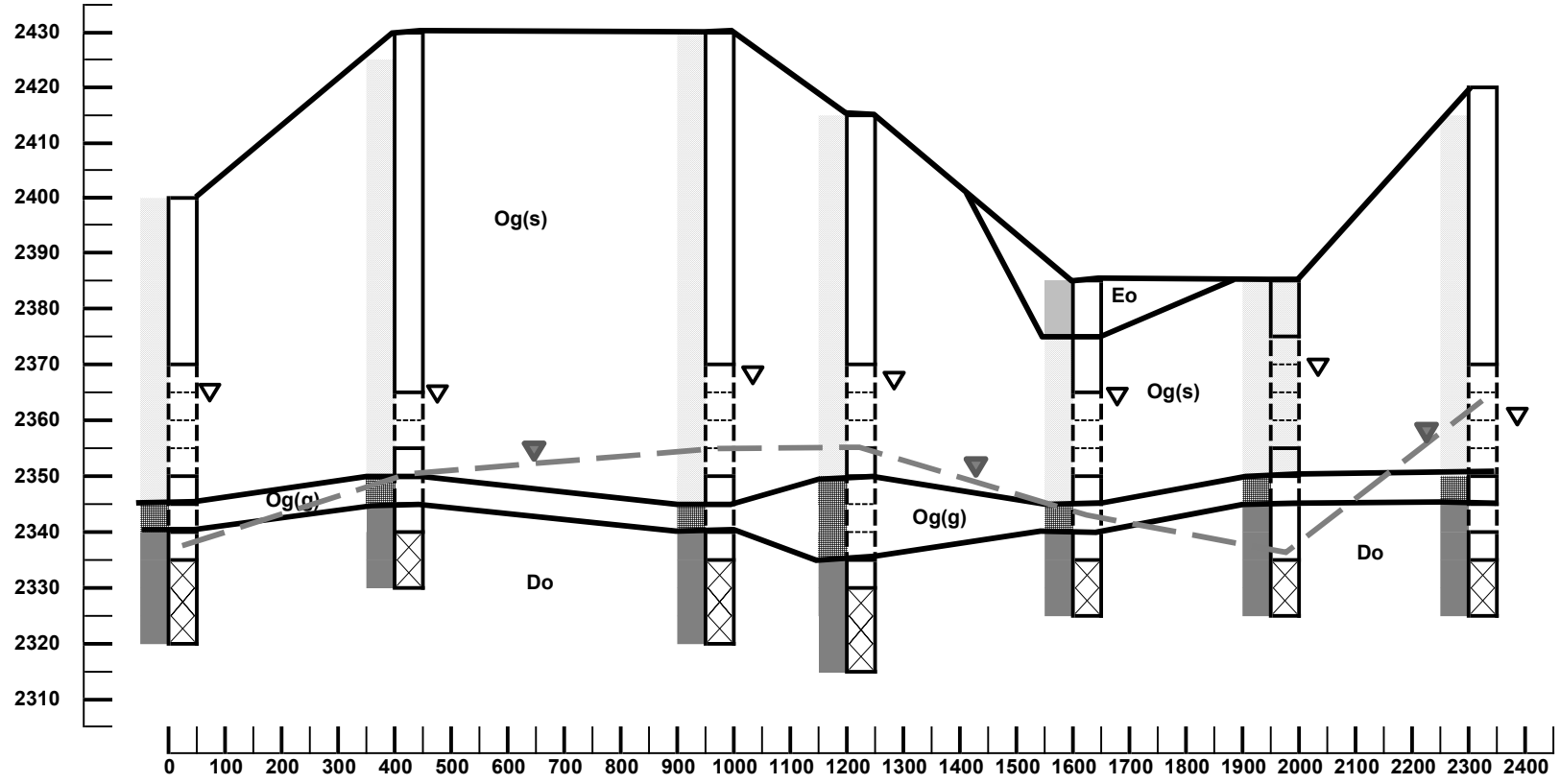
SILT
SAND
GRAVEL
CLAY
Plugged borehole below screen
Screened Interval

Figure XI.D.3.c.(2a)-2

Cross-Section SB-1 to SB-2 - Southern Property Line (West End)

Sheet 4 of 6

Reference Point:	SB-1 (WEST)						SB-2 (CENTRAL)
Well No.	RW-141	RW-198	RW-142	RW-197	RW-112	RW-140	RW-199
Northing Grid Loc	237,434	237,508	237,655	237,968	237,781	237,849	237,742
Easting Grid Loc.	789,813	790,200	790,807	792,117	791,370	791,712	791,038
Top Casing (ft-msl)	2406.25	2433.13	2436.69	2419.37	2387.48	2388.84	2440.42
Top Grade (ft-msl)	2402.71	2430.8	2431.86	2417.5	2385.54	2385.79	2419.8
Date Drilled:	Feb-94	Oct-96	Feb-94	Oct-96	Sep-93	Feb-94	Oct-96
Top Saturation (ft-msl)	2363.71	2362.8	2366.86	2365.5	2362.54	2367.79	2359.8
Top Hydrocaron (Jan-2010)	na	na	na	na	na	na	na
Avg. Product. Rate (bbl.day)	114	244	253	459	392	227	470
Avg. Induced Water Level	2338.98	2350.43	2355.14	2355.42	2343.59	2336.6	2364.84



Formations & Lithology

Eo - Eolian windblown silt and sand

Og(s) - Ogallala formation upper sand unit

Og(g) - Ogallala formation basal gravel unit

Do - Dockum formation red-bed clay

SILT
SAND
GRAVEL
CLAY

Top of Saturation determined at Installation

Water Level July 2023

Plugged borehole below screen

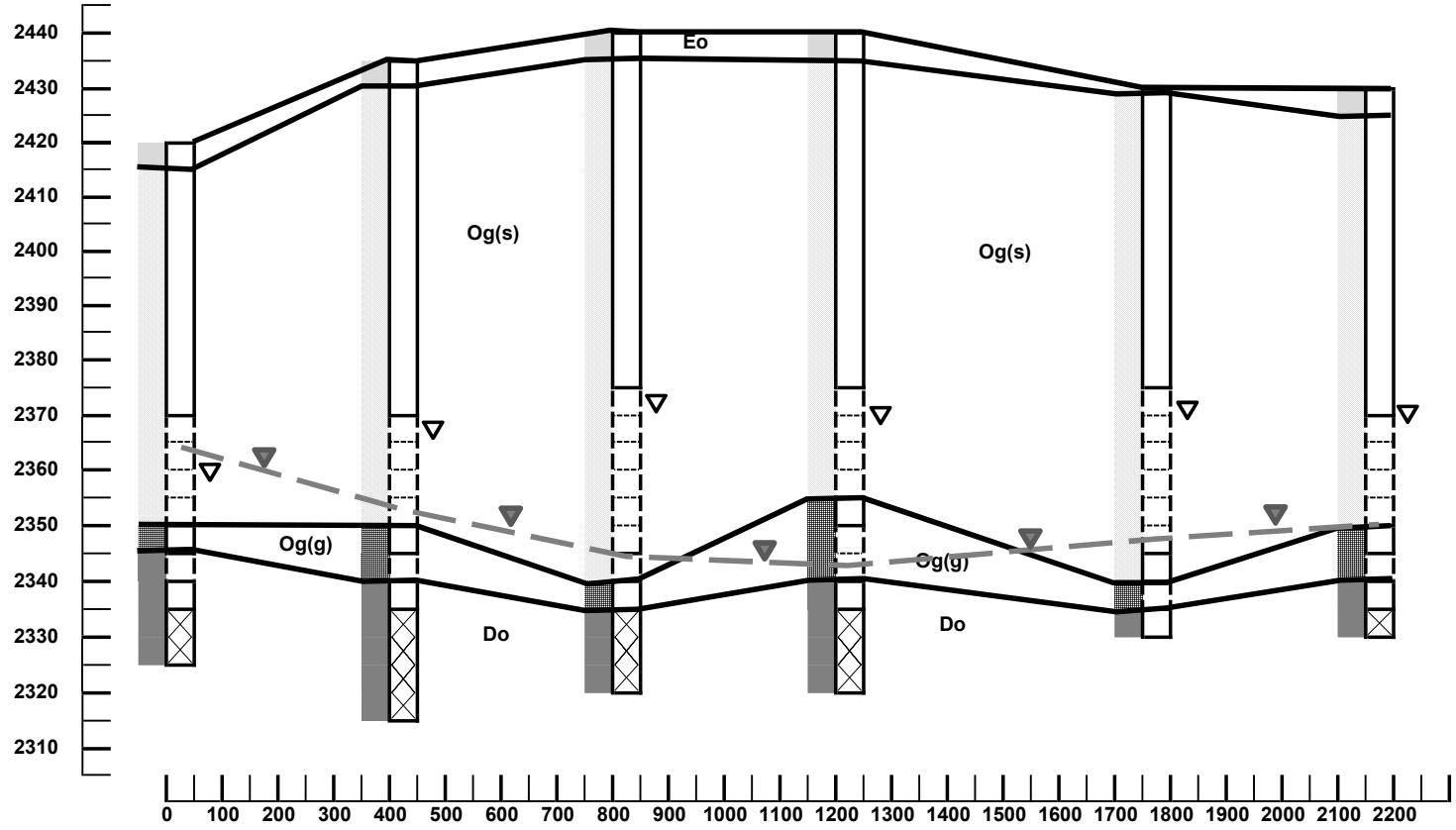
Screened Interval

Figure XI.D.3.c.(2a)-2

Cross-Section SB-2 to SB-3 - Southern Property Line (East End)

Sheet 5 of 6

Reference Point:	SB-2 (CENTRAL)					SB-3 (EAST)
Well No.	RW-199	RW-143	RW-196	RW-144	RW-195	RW-145
Northing Grid Loc	237,742	238,020	238,164	238,216	238,360	238,417
Easting Grid Loc.	791,038	792,460	792,921	793,318	793,840	79,203
Top Casing (ft-msl)	2440.42	2441.83	2440.73	2440.68	2434.41	2431.88
Top Grade (ft-msl)	2419.8	2436.77	2438	2438.26	2432.2	2429.25
Date Drilled:	Oct-96	Feb-94	Oct-96	Feb-94	Oct-96	Feb-94
Top Saturation (ft-msl)	2359.8	2365.77	2370	2368.26	2369.2	2369.25
Top Hydrocaron (Jan-2010)	na	na	na	na	na	na
Avg. Product. Rate (bbl.day)	470	314	273	132	216	317
Avg. Induced Water Level	2364.84	2353.91	2344.23	2342.83	2347.07	2349.56



Formations & Lithology

Eo - Eolian windblown silt and sand

Og(s) - Ogallala formation upper sand unit

Og(g) - Ogallala formation basal gravel unit

Do - Dockum formation red-bed clay

SILT
SAND
GRAVEL
CLAY

Top of Saturation determined at Installation

Water Level July 2023

Plugged borehole below

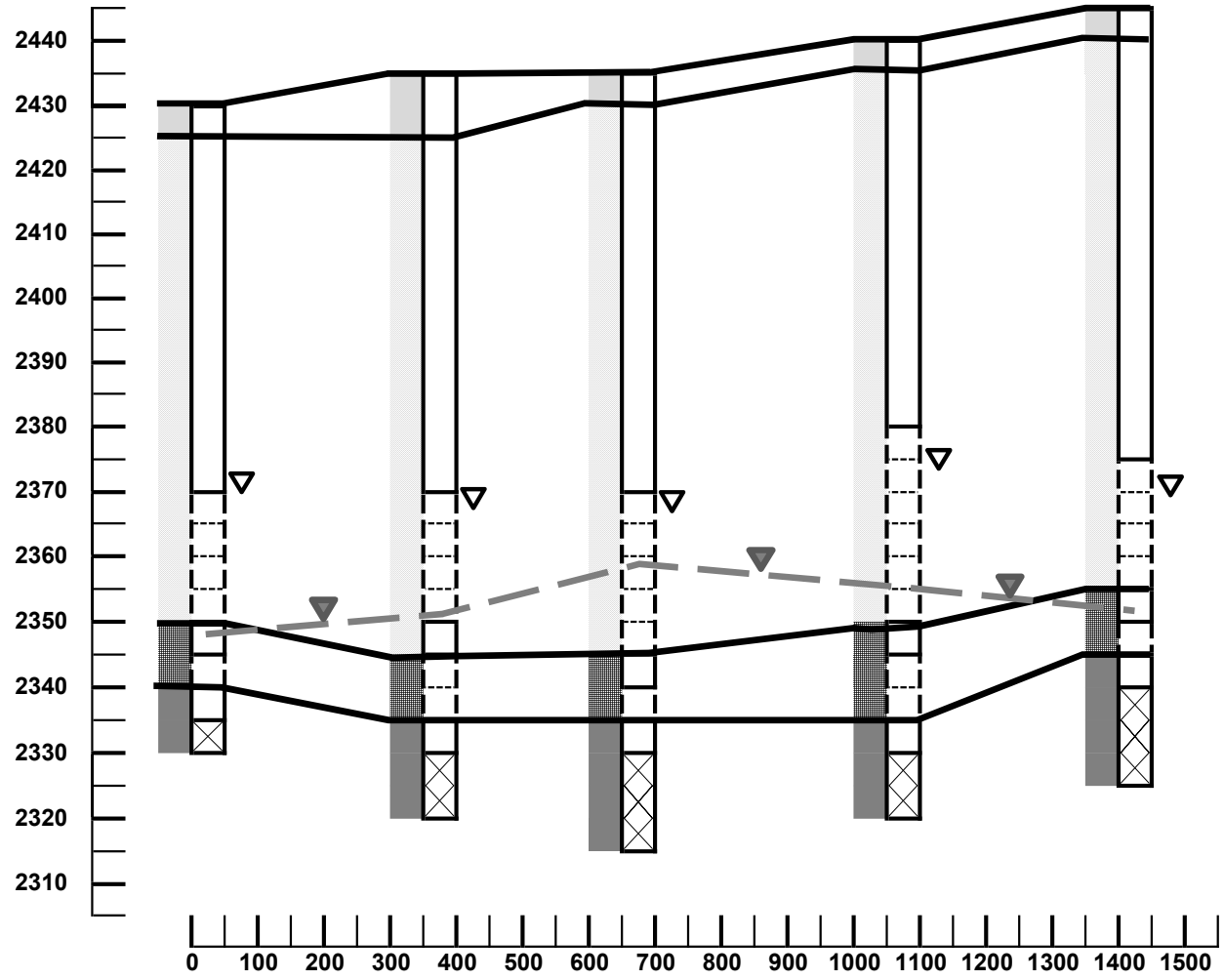
Screened Interva

Figure XI.D.3.c.(2a)-2

Cross-Section SB-3 to SB-4 - Southwest Property Line

Sheet 6 of 6

Reference Point:	SB-3 (SOUTH)				SB-4 (NORTH)
Well No.	RW-145	RW-170	RW-147	RW-194	RW-146
Northing Grid Loc	238,417	238,799	239,790	239,499	239,131
Easting Grid Loc.	79,203	793,160	793,936	794,005	794,087
Top Casing (ft-msl)	2431.88	2435.15	2448.4	2441.86	2441.48
Top Grade (ft-msl)	2429.25	2433.15	2445.33	2441.5	2437.86
Date Drilled:	Feb-94	Aug-95	Feb-94	Oct-96	Feb-94
Top Saturation (ft-msl)	2369.25	2367.15	2366.33	2374.5	2369.86
Top Hydrocaron (Jan-2010)	na	na	na	na	na
Avg. Product. Rate (bbl.day)	317	264	319	236	248
Avg. Induced Water Level	2349.56	2351.83	2358.92	2355.38	2346.08



Formations & Lithology

Eo - Eolian windblown silt and sand
Og(s) - Ogallala formation upper sand unit
Og(g) - Ogallala formation basal gravel unit
Do - Dockum formation red-bed clay
Top of Saturation determined at Installation
Water Level July 2023

SILT
SAND
GRAVEL
CLAY
Plugged borehole below
Screened Interva

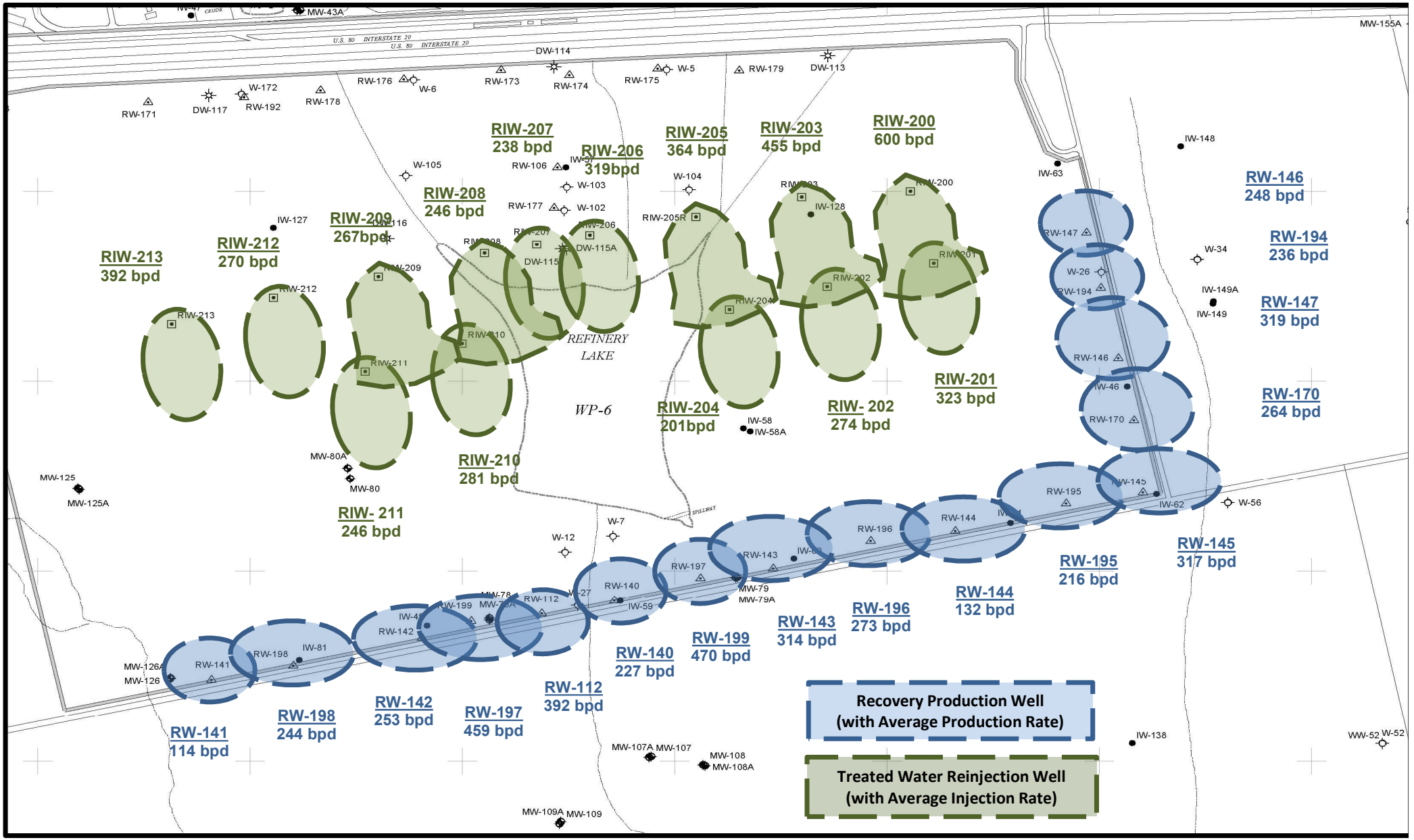


Figure No.	XI.D.3.c.(2a)-3
Sheet 1 of 1	
Facility	Big Spring Refinery
Owner	Alon USA LP

Figure Title

RADIUS OF INFLUENCE FOR PRODUCING AND REINJECTION WELLS

ATLAS

September 23, 2025

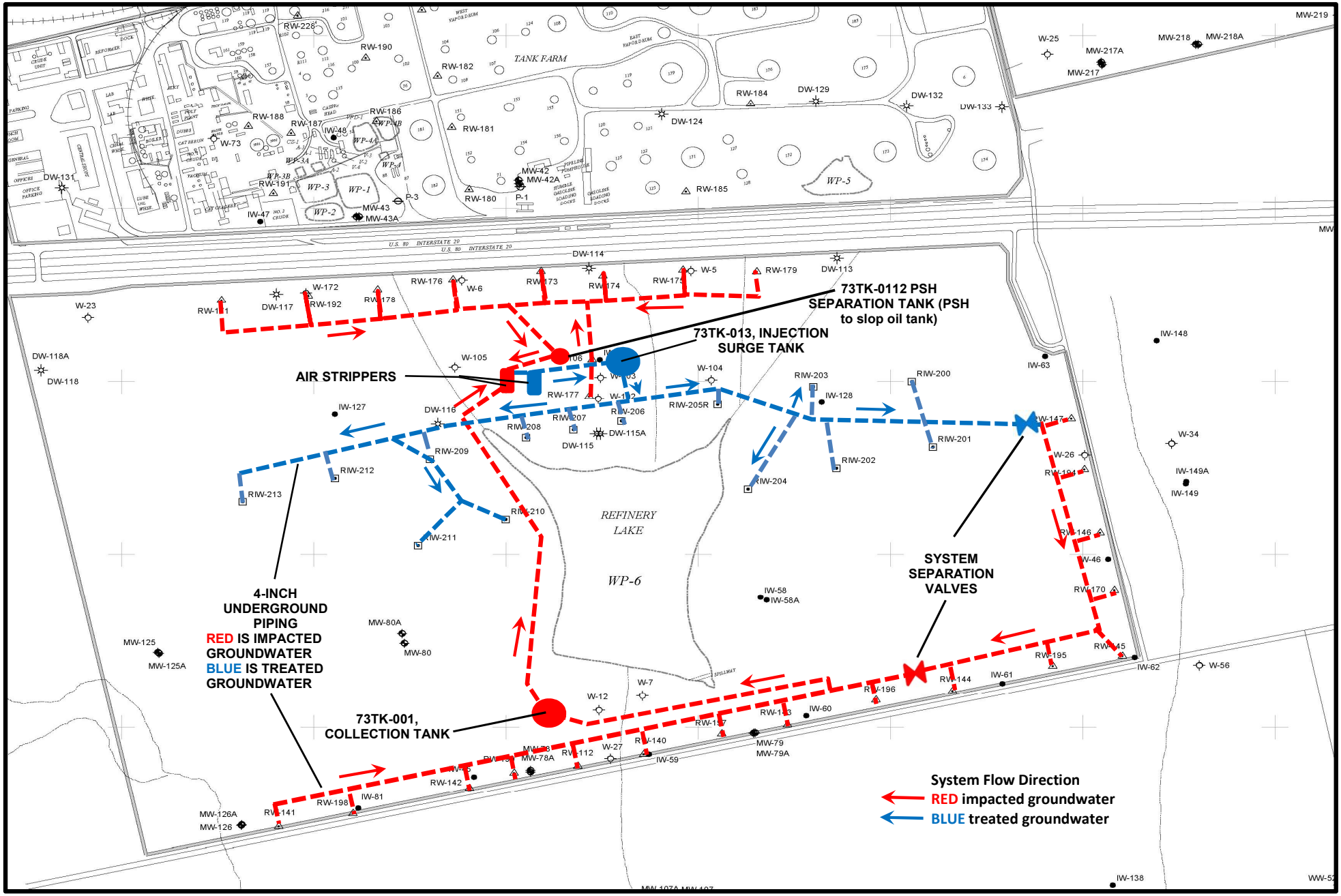


Figure No. XI.D.3.c.(2a)-4	Figure Title		
Sheet 1 of 1	RECOVERY SYSTEM EXISTING COLLECTION AND TREATMENT LAYOUT		Rev. 1 07/15/2025 pg. 1223
Facility Big Spring Refinery		ATLAS	
Owner Alon USA LP		September 23, 2023	

ATTACHMENT XI.D.3.C(2A)-A - REMEDIATION SYSTEM WELL LOGS

SOUTH BOUNDARY DISSOLVED-PHASE HYDROCARBON RECOVERY WELL LOGS

RECOVERY WELL CONSTRUCTION

WELL NO. RW-112

CLIENT: FINA OIL AND CHEMICAL COMPANY JOB NO: 019505.02 SHEET 1 OF 1

SITE: Big Spring, Texas – South Boundary DATE: START: 14 Sept. 93 FINISH: 14 Sept. 93

GEOLOGIST: James D. Shotwell DRILLER: Choate Well Sevices, Inc. DRILLING RIG TYPE: Failing 1500

DRILLING METHODS: Air Rotary TOTAL DEPTH: 60 feet HOLE DIAMETER: 12.25 inches

SITE COORDINATES: N237781.46 / E791370.45 ELEVATIONS: GROUND: 2385.50 PAD: 2385.54 TOC: 2387.48 PROT. CSG: N/A

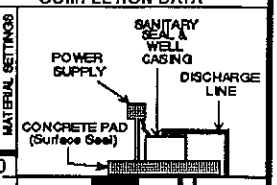
PUMP INFORMATION: TYPE: _____ MODEL: _____ INTAKE LEVEL: _____ Hp GPM

JONES AND NEUSE, INC.
Environmental and Engineering Consultants

LITHOLOGIC DESCRIPTION

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	
0				SP		Sand uniform, fine–very fine grained, loose, red–tan, damp, no odor, 5–10% fines.
10				SP		Sand as above.
				SP		Gravelly Sand uniform, fine–very fine, loose, dry, with 5% Gravel, medium, loose, rounded quartz and caliche , no odor.
20						SATURATION @ 23 FEET
				SC		Clayey Sand very fine, loosely cemented, tan, no odor, 15% fines, saturated.
30				SM		Silty Sand very fine–fine, loose, red–tan, saturated, no odor, 15–20% fines.
				SP		Sand uniform, fine, loose, red–orange, saturated, slight HC odor.
40				SM		Gravelly Silty Sand fine, loose, red, saturated, slight HC odor, 15% rounded quartz
				GP		Sandy Gravel and chert Gravel, 10% Silt. medium–coarse, loose, rounded to angular, quartz, chert, and
				CH		Clay limestone, dark gray, tan and red, saturated. highly plastic, stiff, orange–red, damp.
50				CH		Clay as above.
60				CH		Clay as above.
						Boring Terminated at 60 feet below grade level.
70						
80						
90						
100						

COMPLETION DATA



MATERIAL SETTING	
0	
10	10" I.D. Steel Cond. Cas.
Bent. Seal	6" Sch. 40 PVC Cas.
20	
Filter Pack Sand	6" PVC 0.02" Mill Slot Scrn.
30	
40	6" Sch. 40 PVC
	0.02" Scrn.
50	Sand Point Set @ 45'
60	
70	
80	
90	
100	

(1) UNIFIED SOIL CLASSIFICATION SYSTEM

RECOVERY.WK3

RECOVERY WELL CONSTRUCTION

WELL NO. RW-140

CLIENT: Fina Oil and Chemical | JOB NO: 019505.2 | SHEET ___ OF ___

SITE: Big Spring Refinery | DATE: START: 2-2-94 | FINISH: 2-2-94

GEOLOGIST: Brad Stokes | DRILLER: Choate Well Services | DRILLING RIG TYPE: Failing 1000

DRILLING METHODS: Air Rotary | TOTAL DEPTH: 60 Feet | HOLE DIAMETER: 12.25 Inch

SITE COORDINATES: N 237849.14, E 791712.21 | ELEVATIONS: GROUND: NA | PAD: 2386.02 | TOC: 2388.84 | PROT. CSG: NA

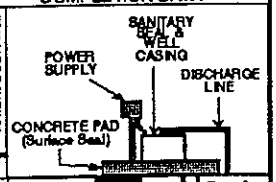
PUMP INFORMATION: TYPE : ___ | MODEL : ___ | INTAKE LEVEL : ___ | ___ Hp | ___ GPM

JONES AND NEUSE, INC.
Environmental and Engineering Consultants

LITHOLOGIC DESCRIPTION

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION
0				SM		SILTY SAND –fine grained, with 20% silt in matrix, rounded quartz grains, loose to compact, reddish brown color, no odor, dry
						–with occasional caliche gravel
10						SILTY SAND –similar to above
						–becomes damp below 17 feet
20						SILTY SAND –saturated below 18 feet, phenolic odor
30						SILTY SAND –similar to above
40				GW		SANDY GRAVEL pebble to cobble sized chert quartz and limestone gravel, with coarse to medium grained quartz sand, saturated, compact, various colors
				CH		SILTY CLAY –moderate plasticity, firm to stiff, with 15% silt in matrix, brick–red color DOCKUM FM.
50						SILTY CLAY –similar to above
60						BORING TERMINATED AT 60.0 FEET BELOW GRADE
70						
80						
90						
100						

COMPLETION DATA



MATERIAL SETTINGS	
0	
6	Cement & Bent. Grout
8	Bent.
12	
32	8/16 Filter Pack Sand
37	
42	
60	Cave –In

Steel Surface Casing

PVC Casing

6 Inch Diam. 0.020 inch Mill slot PVC Screen

PVC Casing

PVC Screen

(1) UNIFIED SOIL CLASSIFICATION SYSTEM

REC–SC.WK3

RECOVERY WELL CONSTRUCTION

WELL NO. RW-141

CLIENT: Fina Oil and Chemical Company JOB NO: 019577.1 SHEET 1 OF 1

SITE: Big Spring Refinery DATE: START: 2-17-94 FINISH: 2-17-94

GEOLOGIST: Brad Stokes DRILLER: Choate Well Services DRILLING RIG TYPE: Failing 1000

DRILLING METHODS: Air Rotary TOTAL DEPTH: 80 Feet HOLE DIAMETER: 12.25 Inch

SITE COORDINATES: N 237433.75, E 789813.28 ELEVATIONS: GROUND: NA PAD: 2402.94 TOC: 2406.25 PROT. CSG: NA

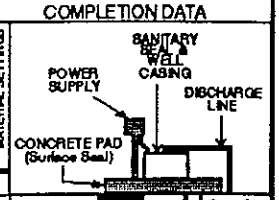
PUMP INFORMATION: TYPE : MODEL : INTAKE LEVEL : Hp GPM

JONES AND NEUSE, INC.
Environmental and Engineering Consultants

LITHOLOGIC DESCRIPTION

DEPTH (FEET)	USCS SYMBOL (1)	LITHOLOGIC DESCRIPTION
0	SM	SILTY SAND –very fine grained quartz sand, subrounded, with 20–30% silt in matrix, dry, compact, light tan color, with occasional caliche nodule.
10	SM	SILTY SAND –similar to above. –becomes reddish tan below 15 feet, with occasional sandstone seam.
20	SM	SILTY SAND –similar to above. –sandstone seam at 25 feet, caliche cement.
30	SM	SILTY SAND –similar to above.
40	SM	–saturated below 39 feet. SILTY SAND –similar to above. –sandstone seam at 45 feet.
50	SM	SILTY SAND –similar to above.
60	GW	SANDY GRAVEL well rounded chert, quartz, and limestone gravel, pebble to cobble sized, coarse to med quartz sand, compact, sat., multicolored.
	CH	SILTY CLAY –moderate plasticity, with 20–25% silt in matrix, stiff, brick-red color, DOCKUM FORMATION.
70	CH	SILTY CLAY –similar to above.
80		BORING TERMINATED AT 80.0 FEET BELOW GRADE
90		
100		

COMPLETION DATA



MATERIAL SETTINGS	
0	Steel Surface Casing
5	Cement & Bent. Grout
20	6 Inch Diam. PVC Casing
22	Bent.
31	8/16 Filter Pack Sand
	6 Inch Diam. 0.020 inch Mill slot PVC Screen
51	PVC Casing
56	PVC Screen
61	
61.5	PVC Cap
	Cave –in
80	

(1) UNIFIED SOIL CLASSIFICATION SYSTEM

REC-SC.WK3

RECOVERY WELL CONSTRUCTION

WELL NO. RW-142

CLIENT: Fina Oil and Chemical Company JOB NO: 019577.1 SHEET 1 OF 2

SITE: Big Spring Refinery DATE: START: 2-16-94 FINISH: 2-16-94

GEOLOGIST: Brad Stokes DRILLER: Choate Well Services DRILLING RIG TYPE: Failing 1000

DRILLING METHODS: Air Rotary TOTAL DEPTH: 110 Feet HOLE DIAMETER: 12.25 Inch

SITE COORDINATES: N 237654.52, E 790806.94 ELEVATIONS: GROUND: NA PAD: 2432.09 TOC: 2436.69 PROT. CSG: NA

PUMP INFORMATION: TYPE : MODEL : INTAKE LEVEL : Hp GPM

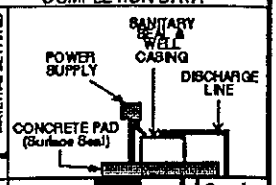
JONES AND NEUSE, INC.
Environmental and Engineering Consultants

LITHOLOGIC DESCRIPTION

DEPTH (FEET)	USCS SYMBOL (1)	LITHOLOGIC DESCRIPTION
0	SM	SILTY SAND –very fine grained quartz sand, with 20–30% silt in matrix, dry, compact to dense, brown color, no odor. –caliche from 3 to 15 feet, white, moderately cemented, hard, gradually diminishes.
10	SM	SILTY SAND –similar to above.
20	SM	SILTY SAND –similar to above, caliche from 20 to 23 feet, hard, white. –light reddish tan color below 23 feet, occasional caliche nodule.
30	SM	SILTY SAND –similar to above.
40	SM	SILTY SAND –similar to above.
50	SM	SILTY SAND –similar to above, reddish tan below 50 feet. –occasional sandstone seams.
60	SM	SILTY SAND –similar to above. –sandstone seam 62–63 feet. –sandstone seam 64–66 feet, saturated below 65 feet, phenolic odor. –calichefied sand below 67 feet.
70	SM	SILTY SAND –similar to above.
80	SM	SILTY SAND –similar to above.
85	GW	SANDY GRAVEL well rounded chert, quartz, and limestone gravel, pebble to cobble sized, coarse to medium grained quartz sand, sat., multicolored.
90	CH	SILTY CLAY –moderate to high plasticity, with 10% silt in matrix, stiff, damp, brick–red color, with small inclusions of light gray clay, DOCKUM FORMATION.
100		

(continued on Sheet 2)

COMPLETION DATA



MATERIAL SETTINGS	
0	Steel Surface Casing
5	
	Cement & Bent. Grout
53	
55	Bent.
60	6 Inch Diam. PVC Casing
	6 Inch Diam. 0.020 inch Mill slot PVC Screen
	8/16 Filter Pack Sand
80	
	PVC Casing
85	
	PVC Screen
90	
90.5	PVC Cap
	Cave–in

(1) UNIFIED SOIL CLASSIFICATION SYSTEM

REC–SC.WK3

RECOVERY WELL CONSTRUCTION

WELL NO. RW-142

CLIENT: Fina Oil and Chemical Company JOB NO: 019577.1 SHEET 2 OF 2

SITE: Big Spring Refinery DATE: START: 2-16-94 FINISH: 2-16-94

GEOLOGIST: Brad Stokes DRILLER: Choate Well Services DRILLING RIG TYPE: Failing 1000

DRILLING METHODS: Air Rotary TOTAL DEPTH: 110 Feet HOLE DIAMETER: 12.25 Inch

SITE COORDINATES: N 237654.52, E 790806.94 ELEVATIONS: GROUND: NA PAD: 2432.09 TOC: 2436.69 PROT. CSG: NA

PUMP INFORMATION: TYPE : MODEL : INTAKE LEVEL : Hp GPM

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION (JONES AND NEUSE, INC. Environmental and Engineering Consultants)	COMPLETION DATA: MATERIAL SETTINGS
100							100 CONTINUED FROM SHEET 1
				CH		SILTY CLAY –moderate to high plasticity, with 10% silt in matrix, stiff, damp, brick–red color, with small inclusions of light gray clay, DOCKUM FORMATION.	Cave–in
110							110
						BORING TERMINATED AT 110.0 FEET BELOW GRADE	
120							
130							
140							
150							
160							
170							
180							
190							
200							

(1) UNIFIED SOIL CLASSIFICATION SYSTEM

REC–SC.WK3

RECOVERY WELL CONSTRUCTION

WELL NO. RW-143

CLIENT: Fina Oil and Chemical Company JOB NO: 019577.1 SHEET 1 OF 2

SITE: Big Spring Refinery DATE: START: 2-15-94 FINISH: 2-15--94

GEOLOGIST: Brad Stokes DRILLER: Choate Well Services DRILLING RIG TYPE: Failing 1000

DRILLING METHODS: Air Rotary TOTAL DEPTH: 120 Feet HOLE DIAMETER: 12.25 Inch

SITE COORDINATES: N 238020.06, E 792459.81 ELEVATIONS: GROUND: NA PAD: 2437.00 TOC: 2441.83 PROT. CSG: NA

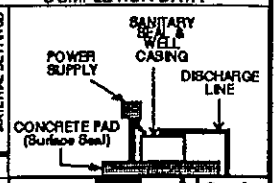
PUMP INFORMATION: TYPE : MODEL : INTAKE LEVEL : Hp GPM

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION
0				SM		SILTY SAND –Very fine grained quartz sand w/20–30% silt in matrix, dry, compact, light reddish tan color. –caliche below 3.5 feet, moderately to lightly cemented white to 1" diminishes gradually.
20				SM		SILTY SAND –hard caliche below 22' to 28'
40				SM		SILTY SAND similar to above
60				SM		SILTY SAND similar to above –sandstone seam @ 65 to 70' & 73–78 –saturated below 71, phenolic odor
80				SM		SILTY SAND similar to above
90				GW		SANDY GRAVEL pebble to cobble sized quartz, chert & limestone gravel well rounded, with medium to coarse qtz. sand, saturated.
100				CH		SILTY CLAY –mod. to high plasticity, stiff, w/10–15% silt in matrix damp, brick–red color DOCKUM FORMATION.

Continued on Page 2

JONES AND NEUSE, INC. Environmental and Engineering Consultants

COMPLETION DATA



MATERIAL SETTINGS	
0	Steel Surface Casing
5	
	Cement & Bent. Grout
54	
56	Bent.
65	8/16 Filter Sand Pack
85	
90	6 Inch Diam. 0.020 inch Mill slot PVC Screen
	PVC Casing
	PVC Screen
95.5	Cave–in

(1) UNIFIED SOIL CLASSIFICATION SYSTEM

REC–SC.WK3

RECOVERY WELL CONSTRUCTION

WELL NO. RW-143

CLIENT: Fina Oil and Chemical Company JOB NO: 019577.1 SHEET 2 OF 2

SITE: Big Spring Refinery DATE: START: 2-15-94 FINISH: 2-15-94

GEOLOGIST: Brad Stokes DRILLER: Choate Well Services DRILLING RIG TYPE: Failing 1000

DRILLING METHODS: Air Rotary TOTAL DEPTH: 120 Feet HOLE DIAMETER: 12.25 Inch

SITE COORDINATES: N 238020.06, E 792459.81 ELEVATIONS: GROUND: NA PAD: 2437.00 TOC: 2441.83 PROT. CSG: NA

PUMP INFORMATION: TYPE : MODEL : INTAKE LEVEL : Hp GPM

JONES AND NEUSE, INC.
Environmental and Engineering Consultants

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION	COMPLETION DATA: MATERIAL SETTINGS
100							100 CONTINUED FROM SHEET 1
				CH		SILTY CLAY –moderate to high plasticity, with 10% silt in matrix, stiff, damp, brick–red color, with small inclusions of light gray clay, DOCKUM FORMATION.	Cave–in
110							
120							120
						BORING TERMINATED AT 120.0 FEET BELOW GRADE	
130							
140							
150							
160							
170							
180							
190							
200							

(1) UNIFIED SOIL CLASSIFICATION SYSTEM

REC–SC.WK3

RECOVERY WELL CONSTRUCTION

WELL NO. RW-144

CLIENT: Fina Oil and Chemical Company JOB NO: 019577.1 SHEET 1 OF 2

SITE: Big Spring Refinery DATE: START: 2-14-94 FINISH: 2-15-94

GEOLOGIST: Brad Stokes DRILLER: Choate Well Services DRILLING RIG TYPE: Failing 1000

DRILLING METHODS: Air Rotary TOTAL DEPTH: 120 Feet HOLE DIAMETER: 12.25 Inch

SITE COORDINATES: N 238215.72, E 793317.59 ELEVATIONS: GROUND: NA PAD: 2438.49 TOC: 2440.68 PROT. CSG: NA

PUMP INFORMATION: TYPE : MODEL : INTAKE LEVEL : Hp GPM

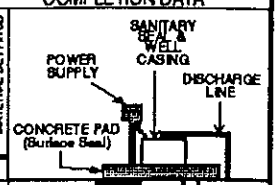
JONES AND NEUSE, INC.
Environmental and Engineering Consultants

LITHOLOGIC DESCRIPTION

DEPTH (FEET)	USCS SYMBOL (1)	STRATIGRAPHY	
0	SM	SILTY SAND	–fine to very fine grained quartz sand, with 20–30% silt in matrix, dry, compact, reddish brown color.
			–caliche from 3 to 10 feet, gradually diminishes.
10			–becomes light reddish tan below 10 feet.
	SM	SILTY SAND	–similar to above.
			–occasional thin seam of moderate to well cemented sandstone.
20	SM	SILTY SAND	–similar to above.
30	SM	SILTY SAND	–similar to above.
40	SM	SILTY SAND	–similar to above.
50			–sandstone seam 48–50 feet
	SM	SILTY SAND	–similar to above.
			–sandstone seam 53–54 feet
60			–sandstone seam at 58 feet
	SM	SILTY SAND	–similar to above.
			–becomes damp below 65 feet
			–sandstone seam 65–66 feet.
70			–sandstone seam 69–70 feet.
	SM	SILTY SAND	–similar to above, saturated below 70 feet, sandstone seam 70–72 feet.
80	GW	SANDY GRAVEL	well rounded chert, quartz, and limestone gravel, pebble to cobble sized, coarse to medium grained quartz sand, saturated, multicolored.
90			
	CH	SILTY CLAY	–moderate to high plasticity, with 10% silt in matrix, stiff, damp, brick–red color, with small inclusions of light gray clay, DOCKUM FORMATION.
100			

(continued on Sheet 2)

COMPLETION DATA



MATERIAL SETTINGS	
0	Steel Surface Casing
5	
	Cement & Bent. Grout
	6 Inch Diam. PVC Casing
54	
56	Bent.
62	8/16 Filter Pack Sand
	6 Inch Diam. 0.020 inch Mill slot PVC Screen
82	
87	PVC Casing
	PVC Screen
97	
97.5	PVC Cap
	Cave–in

(1) UNIFIED SOIL CLASSIFICATION SYSTEM

REC–SC.WK3

RECOVERY WELL CONSTRUCTION

WELL NO. RW-144

CLIENT: Fina Oil and Chemical Company JOB NO: 019577.1 SHEET 2 OF 2

SITE: Big Spring Refinery DATE: START: 2-14-94 FINISH: 2-15-94

GEOLOGIST: Brad Stokes DRILLER: Choate Well Services DRILLING RIG TYPE: Failing 1000

DRILLING METHODS: Air Rotary TOTAL DEPTH: 120 Feet HOLE DIAMETER: 12.25 Inch

SITE COORDINATES: N 238215.72, E 793317.59 ELEVATIONS: GROUND: NA PAD: 2438.49 TOC: 2440.68 PROT. CSG: NA

PUMP INFORMATION: TYPE : MODEL : INTAKE LEVEL : Hp GPM

JONES AND NEUSE, INC.
Environmental and Engineering Consultants

LITHOLOGIC DESCRIPTION

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION	COMPLETION DATA: MATERIAL SETTINGS
100							100 CONTINUED FROM SHEET 1
				CH		SILTY CLAY –moderate to high plasticity, with 10% silt in matrix, stiff, damp, brick-red color, with small inclusions of light gray clay, DOCKUM FORMATION.	
110				CH		SILTY CLAY –similar to above.	Cave-in
120							120
						BORING TERMINATED AT 120.0 FEET BELOW GRADE	
130							
140							
150							
160							
170							
180							
190							
200							

(1) UNIFIED SOIL CLASSIFICATION SYSTEM

REC-SC.WK3

RECOVERY WELL CONSTRUCTION

WELL NO. RW-145

CLIENT: Fina Oil and Chemical Company JOB NO: 019577.1 SHEET 1 OF 1

SITE: Big Spring Refinery DATE: START: 2-11-94 FINISH: 2-14-94

GEOLOGIST: Brad Stokes DRILLER: Choate Well Services DRILLING RIG TYPE: Failing 1000

DRILLING METHODS: Air Rotary TOTAL DEPTH: 100 Feet HOLE DIAMETER: 12.25 Inch

SITE COORDINATES: N 238417.18, E 794203.28 ELEVATIONS: GROUND: NA PAD: 2429.48 TOC: 2431.88 PROT. CSG: NA

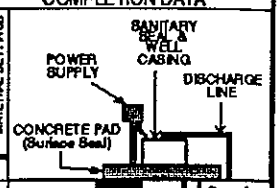
PUMP INFORMATION: TYPE : MODEL : INTAKE LEVEL : Hp GPM

JONES AND NEUSE, INC.
Environmental and Engineering Consultants

LITHOLOGIC DESCRIPTION

DEPTH (FEET)	USCS SYMBOL (1)	STRATIGRAPHY	
0	SM	SILTY SAND	–fine to very fine grained quartz sand, with 15–30% silt in matrix, dry, compact, reddish brown color. –with occasional caliche gravel at 5 feet.
10	SM	SILTY SAND	–similar to above. –becomes light reddish tan below 15 feet.
20	SM	SILTY SAND	–similar to above.
30	SM	SILTY SAND	–sandstone seams 28–33 feet. –similar to above.
40	SM	SILTY SAND	–similar to above.
50	SM	SILTY SAND	–similar to above.
60	SM	SILTY SAND	–becomes damp below 57 feet. –sandstone seam at 58–60 feet. –similar to above, saturated below 60 feet.. –sandstone seam at 63 feet.
70	SM	SILTY SAND	–similar to above.
80	GW	SANDY GRAVEL	well rounded chert, quartz, and limestone gravel, pebble to cobble sized, coarse to medium grained quartz sand, compact, saturated, multicolored.
90	CH	SILTY CLAY	–moderate plasticity, with 20–25% silt in matrix, stiff, brick–red color, DOCKUM FORMATION.
	CH	SILTY CLAY	–similar to above.
100			BORING TERMINATED AT 100.0 FEET BELOW GRADE

COMPLETION DATA



MATERIAL SETTINGS	
0	Steel Surface Casing
5	Cement & Bent. Grout
43	Bent.
57	6 Inch Diam. PVC Casing
77	8/16 Filter Pack Sand
82	6 Inch Diam. 0.020 inch Mill slot PVC Screen
87	PVC Casing
87.5	PVC Screen
	PVC Cap
	Cave –in

(1) UNIFIED SOIL CLASSIFICATION SYSTEM

REC–SC.WK3

RECOVERY WELL CONSTRUCTION

WELL NO. RW-146

CLIENT: Fina Oil and Chemical Company JOB NO: 019577.1 SHEET 1 OF 2

SITE: Big Spring Refinery DATE: START: 2-10-94 FINISH: 2-11-94

GEOLOGIST: Brad Stokes DRILLER: Choate Well Services DRILLING RIG TYPE: Failing 1000

DRILLING METHODS: Air Rotary TOTAL DEPTH: 100 Feet HOLE DIAMETER: 12.25 Inch

SITE COORDINATES: N 239130.98, E 794086.69 ELEVATIONS: GROUND: NA PAD: 2438.09 TOC: 2441.48 PROT. CSG: NA

PUMP INFORMATION: TYPE: _____ MODEL: _____ INTAKE LEVEL: _____ ___ Hp ___ GPM

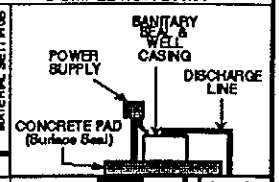
JONES AND NEUSE, INC.
Environmental and Engineering Consultants

LITHOLOGIC DESCRIPTION

DEPTH (FEET)	USCS SYMBOL (1)	LITHOLOGIC DESCRIPTION
0	SM	SILTY SAND –fine to very fine grained quartz sand, with 20% silt in matrix, dry, compact, light reddish tan color. –caliche at 4 feet, gradually diminishes at 10 feet. –occasional sandstone seams
10	SM	SILTY SAND –similar to above.
20	SM	SILTY SAND –similar to above.
30	SM	SILTY SAND –similar to above.
40	SM	SILTY SAND –similar to above.
50	SM	SILTY SAND –similar to above.
60	SM	SILTY SAND –similar to above.
70		–saturated below 68 feet.
	SM	SILTY SAND –similar to above.
80	SM	SILTY SAND –similar to above.
		–red colored sand below 85 feet, "false Red Bed", phenolic odor
90	SM	SILTY SAND –similar to above.
100	GW	SANDY GRAVEL well rounded chert, quartz, and limestone gravel, pebble to cobble sized, coarse to medium grained quartz sand, saturated, compact, multicolored.

(continued on Sheet 2)

COMPLETION DATA



MATERIAL SETTINGS	
0	Steel Surface Casing
5	
	Cement & Bent. Grout
55	Bent.
61	
66	6 Inch Diam. 0.020 inch Mill slot PVC Screen
	8/16 Filter Pack Sand
91	PVC Casing
96	PVC Screen

(1) UNIFIED SOIL CLASSIFICATION SYSTEM

REC-SC.WK3

RECOVERY WELL CONSTRUCTION

WELL NO. RW-146

CLIENT: Fina Oil and Chemical Company JOB NO: 019577.1 SHEET 2 OF 2

SITE: Big Spring Refinery DATE: START: 2-10-94 FINISH: 2-11-94

GEOLOGIST: Brad Stokes DRILLER: Choate Well Services DRILLING RIG TYPE: Failing 1000

DRILLING METHODS: Air Rotary TOTAL DEPTH: 120 Feet HOLE DIAMETER: 12.25 Inch

SITE COORDINATES: N 239130.98, E 794086.69 ELEVATIONS: GROUND: NA PAD: 2438.09 TOC: 2441.48 PROT. CSG: NA

PUMP INFORMATION: TYPE : MODEL : INTAKE LEVEL : Hp GPM

JONES AND NEUSE, INC.
Environmental and Engineering Consultants

LITHOLOGIC DESCRIPTION

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION
100				CH		SILTY CLAY –moderate plasticity, with 15–20% silt in matrix, stiff, brick red color, DOCKUM FORMATION. 101.5
110				CH		SILTY CLAY –similar to above.
120						BORING TERMINATED AT 120.0 FEET BELOW GRADE
130						
140						
150						
160						
170						
180						
190						
200						

COMPLETION DATA

MATERIAL SETTINGS	
100	CONTINUED FROM SHEET 1
101	Filter Sand / Screen / PVC Cap
	Cave-in
120	

(1) UNIFIED SOIL CLASSIFICATION SYSTEM

REC-SC.WK3

RECOVERY WELL CONSTRUCTION

WELL NO. RW-147

CLIENT: Fina Oil and Chemical Company JOB NO: 019577.1 SHEET 1 OF 2

SITE: Big Spring Refinery DATE: START: 2-9-94 FINISH: 2-10-94

GEOLOGIST: Brad Stokes DRILLER: Choate Well Services DRILLING RIG TYPE: Failing 1000

DRILLING METHODS: Air Rotary TOTAL DEPTH: 100 Feet HOLE DIAMETER: 12.25 Inch

SITE COORDINATES: N 239790.45, E 793936.21 ELEVATIONS: GROUND: NA PAD: 2445.56 TOC: 2448.40 PROT. CSG: NA

PUMP INFORMATION: TYPE: MODEL: INTAKE LEVEL: Hp GPM

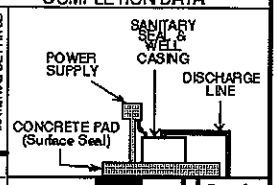
JONES AND NEUSE, INC.
Environmental and Engineering Consultants

LITHOLOGIC DESCRIPTION

DEPTH (FEET)	USCS SYMBOL (1)	LITHOLOGIC DESCRIPTION
0	SM	SILTY SAND –very fine grained quartz sand, with 35% silt in matrix, dry, compact, light reddish tan color.
		–caliche from 4.5 to 8 feet, white, hard, gradually diminishes.
10	SM	SILTY SAND –similar to above.
		–hard caliche from 16 to 17.5 feet.
20	SM	SILTY SAND –similar to above.
30	SM	SILTY SAND –similar to above.
		–sandstone seam at 39 feet.
40	SM	SILTY SAND –similar to above.
		–thin sandstone seams throughout section.
50	SM	SILTY SAND –similar to above.
60	SM	SILTY SAND –similar to above.
70	SM	SILTY SAND –similar to above.
		–saturated below 79 feet.
80	SM	SILTY SAND –similar to above.
		–red colored sand below 85 feet, "false Red Bed", phenolic odor
90	GW	SANDY GRAVEL well rounded chert, quartz, and limestone gravel, pebble to cobble sized, coarse to medium grained quartz sand, saturated, multicolored.
100		

(continued on Sheet 2)

COMPLETION DATA



MATERIAL SETTINGS	
0	Steel Surface Casing
5	
	Cement & Bent. Grout
55	
	6 Inch Diam. PVC Casing
61	Bent.
67	
70	6 Inch Diam. 0.020 inch Mill slot PVC Screen
	8/16 Filter Pack Sand
90	PVC Casing
95	
100	PVC Screen

(1) UNIFIED SOIL CLASSIFICATION SYSTEM

REC-SC.WK3

RECOVERY WELL CONSTRUCTION

WELL NO. RW-147

CLIENT: Fina Oil and Chemical Company JOB NO: 019577.1 SHEET 2 OF 2

SITE: Big Spring Refinery DATE: START: 2-9-94 FINISH: 2-10-94

GEOLOGIST: Brad Stokes DRILLER: Choate Well Services DRILLING RIG TYPE: Failing 1000

DRILLING METHODS: Air Rotary TOTAL DEPTH: 120 Feet HOLE DIAMETER: 12.25 Inch

SITE COORDINATES: N 239790.45, E 793936.21 ELEVATIONS: GROUND: NA PAD: 2445.56 TOC: 2448.40 PROT. CSG: NA

PUMP INFORMATION: TYPE : MODEL : INTAKE LEVEL : Hp GPM

JONES AND NEUSE, INC.
Environmental and Engineering Consultants

LITHOLOGIC DESCRIPTION

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION
100				GW		SANDY GRAVEL well rounded chert, quartz and limestone gravel, pebble to cobble sized, coarse to med grained quartz sand, sat., multicolored (100.5)
				CH		SILTY CLAY –moderate plasticity, with 20% silt in matrix, firm to stiff, brick red color, damp, DOCKUM FORMATION.
110				CH		SILTY CLAY –similar to above.
120						BORING TERMINATED AT 120.0 FEET BELOW GRADE
130						
140						
150						
160						
170						
180						
190						
200						

COMPLETION DATA

MATERIAL SETTINGS	
100	CONTINUED FROM SHEET 1
	Sand / PVC Cap
	Cave-in
120	

(1) UNIFIED SOIL CLASSIFICATION SYSTEM

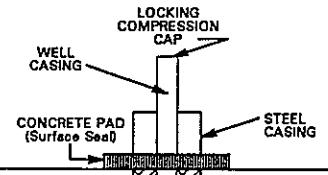
REC-SC.WK3

RMT INC.

RW-170

Client:		Start Date:	End Date:	Page of
FINA OIL AND CHEMICAL COMPANY		8-22-95	8-23-95	1 3
Site:		Drilling Method:		Project Number:
IH-20 EAST AT REFINERY ROAD, BIG SPRING, TX 79720		AIR/MUD ROTARY		50-0195.82.001
Geologist:	Driller:	Drill Rig Type:		Borehole Diameter:
COLBY DRECHSEL	C.D.S./D. CHOATE	FAILING 1000		12.25 Inches
Site Coordinates:	Total Depth:	Surface Elevation (ft.):	TOC Elevation (ft.):	PAD Elevation (ft.):
N: 238799.2000 E: 794159.8300	110.00	2433.15	2435.15	2433.15
Datum Description:	Datum Elevation:	Water Level Depth Below TOC (ft):	Date:	Time:
Texas State Plane CS, NCentral Zone				

Sample Type	Recovery (inches)	Saturation	OVM (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				1–39		SAND (SP) - 60-70% caliche nodules up to 6 cm diam., overall white to pinkish hue, moderately cemented, well sorted.
						SAND (SP) - soft, damp, well sorted, nonplastic
						white to light pink color
						SANDSTONE (Ss) - white, moderately lithified (calcareous), powdery cuttings, fine grained quartz(90%) sand, (OGALLALA FM.)
						SAND (SP) - pink, soft, moderately, calcareous cemented, (OGALLALA FM.)
						SANDSTONE (Ss) - moderately to well cemented, fine grained quartz (90%) sand, well sorted, est. 20% pore space occupied by calcareous cement, (OGALLALA FM.)



10" ID Steel surface casing to 4'

6" ID Schedule 40 PVC riser

Cement/Bentonite grout

WELL 0195 9/28/95

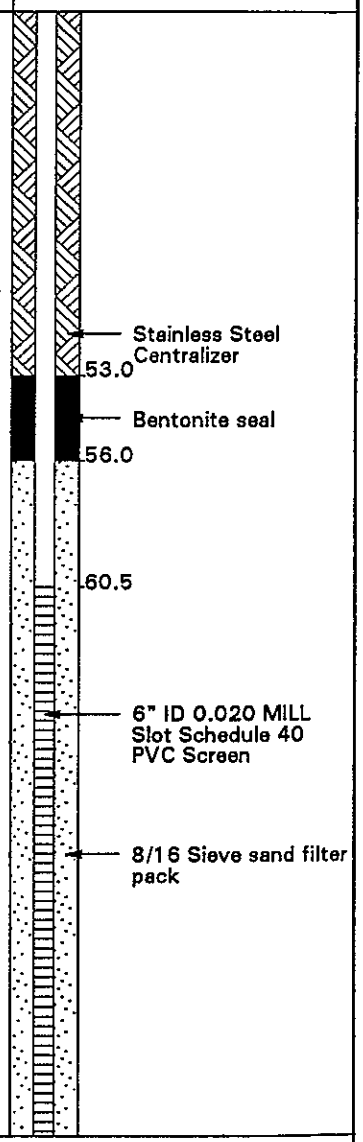
F-204A Austin (8-95)

Continued Next Page

RW-170

Client:		Start Date:	End Date:	Page of
FINA OIL AND CHEMICAL COMPANY		8-22-95	8-23-95	2 3
Site:		Drilling Method:		Project Number:
IH-20 EAST AT REFINERY ROAD, BIG SPRING, TX 79720		AIR/MUD ROTARY		50-0195.82.001
Geologist:	Driller:	Drill Rig Type:		Borehole Diameter:
COLBY DRECHSEL	C.D.S./D. CHOATE	FAILING 1000		12.25 Inches
Site Coordinates:	Total Depth:	Surface Elevation (ft.):	TOC Elevation (ft.):	PAD Elevation (ft.):
N: 238799.2000 E: 794159.8300	110.00	2433.15	2435.15	2433.15
Datum Description:	Datum Elevation:	Water Level Depth Below TOC (ft):	Date:	Time:
Texas State Plane CS, NCentral Zone				

Sample Type	Recovery (inches)	Saturation	OVM (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				41–49		white, moderately cemented
				50–54		SAND (SP) - red, soft, slight cementation, nonplastic, (OGALLALA FM.)
				55–59		SANDSTONE (Ss) - white, medium-hard sandstone, well cemented(calcareous), fine grained quartz sand, (OGALLALA FM.)
				60–65		pinkish white
	18	▽		66–69		SAND (SP) - moist, pink, low plasticity, slightly cemented, soupy texture, 10% very fine grained buff colored silt, (OGALLALA FM.)
	4			70–79		SANDSTONE (Ss) - hard, white, nonplastic, fine grained quartz sand, (OGALLALA FM.)



WELL 0195 9/28/95

F-204A Austin (8-95)

Continued Next Page

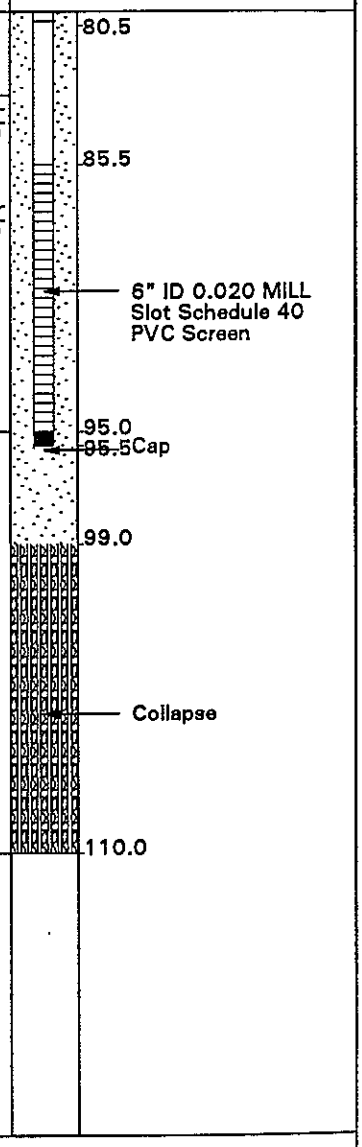
RMT INC.

RW-170

Client:		Start Date:	End Date:	Page of
FINA OIL AND CHEMICAL COMPANY		8-22-95	8-23-95	3 3
Site:		Drilling Method:		Project Number:
IH-20 EAST AT REFINERY ROAD, BIG SPRING, TX 79720		AIR/MUD ROTARY		50-0195.82.001
Geologist:	Driller:	Drill Rig Type:		Borehole Diameter:
COLBY DRECHSEL	C.D.S./D. CHOATE	FAILING 1000		12.25 Inches
Site Coordinates:	Total Depth:	Surface Elevation (ft.):	TOC Elevation (ft.):	PAD Elevation (ft.):
N: 238799.2000 E: 794159.8300	110.00	2433.15	2435.15	2433.15
Datum Description:	Datum Elevation:	Water Level Depth Below TOC (ft):	Date:	Time:
Texas State Plane CS, NCentral Zone				

Sample Type	Recovery (inches)	Saturation	OVM (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				81–84		SAND (SP) - pinkish color, (OGALLALA FM.)
				83–84		CLAY (CH) - "false" red bed, high plasticity, firm, brick red.
				84–87		GRAVEL (GW) - fine to medium pebble gravel, moderately sorted, hard, saturated; composed of sub-angular quartz, limestone, and chert, (OGALLALA FM.)
				87–88		SAND (SP) - soft, pink, medium grained, (OGALLALA FM.)
				88–95		GRAVEL (GW) - fine to medium grained pebble gravel, hard, moderately sorted, similar to above gravel lense, (OGALLALA FM.)
				90–95		SAND (SP) - soft, medium to fine quartz sand, well sorted, (OGALLALA FM.)
				95–110		CLAY (CH) - red, high plasticity, damp, (DOCKUM FM.)
				110		BOREHOLE TERMINATED 110 FEET BELOW GRADE

Two soil samples were extracted during the drilling of this well for in-situ bioremediation studies. 1.5" * 18" split-spoon tools were decontaminated using an initial steam wash and then a 91% Isopropyl alcohol flame sterilization prior to sampling.



WELL 0195 9/28/95

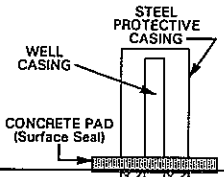
F-204A Austin (8-95)

WELL CONSTRUCTION LOG

WELL NO. RW-194

Client: FINA OIL AND CHEMICAL COMPANY		Start Date: 10-2-96	End Date: 10-2-96	Page 1 of 3
Site: BIG SPRING, TEXAS		Drilling Method: AIR/WET ROTARY		Project Number: 50-01858.16
Geologist: BRAD STOKES	Driller: CHOATE WELL SERVICE	Drill Rig Type: GARDNER DENVER 1500		Borehole Diameter: 7.88 Inches
Site Coordinates, UTM in ft.: N: 239498.8500 E: 794005.0200	Total Depth (ft-bgl): 120.00	Surface Elevation(ft) 2441.50	TOC Elevation(ft) 2441.86	PAD Elevation(ft) 2443.89
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (feet)	Saturation	OVM (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				1-3		Clayey Sand (SC) - Fine to medium, with 15% clay, some silt, damp, reddish brown.
				4-5		Caliche from 4-5 feet, dry, hard, white.
				6-9		Silty Sand (SM) - Very fine grained, with 25-35% silt, compact, dry, pink to reddish tan color, lithology remains the same between cemented zones.
				10-19		Silty Sand (SM) - Similar to above.
				20-29		Silty Sand (SM) - Similar to above. Lightly cemented zone, carbonate cement. Lightly cemented zone, carbonate cement.
				30-39		Silty Sand (SM) - Similar to above.
				40-49		Silty Sand (SM) - Similar to above. Lightly cemented zone, carbonate cement.



WELL 01858 1/7/97

F-204A Austin (8-95)

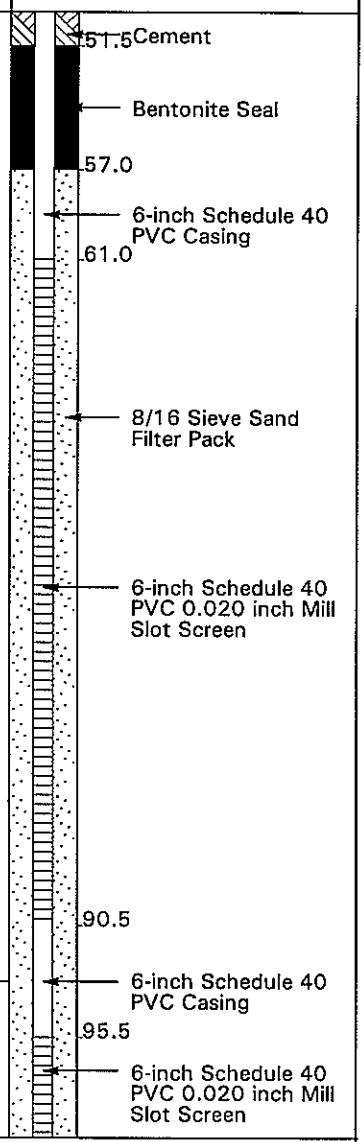
Continued Next Page

WELL CONSTRUCTION LOG

WELL NO. RW-194

Client:		Start Date:	End Date:	Page of
FINA OIL AND CHEMICAL COMPANY		10-2-96	10-2-96	2 3
Site:		Drilling Method:		Project Number:
BIG SPRING, TEXAS		AIR/WET ROTARY		50-01858.16
Geologist:	Driller:	Drill Rig Type:		Borehole Diameter:
BRAD STOKES	CHOATE WELL SERVICE	GARDNER DENVER 1500		7.88 Inches
Site Coordinates, UTM in ft.:	Total Depth (ft-bgl):	Surface Elevation(ft)	TOC Elevation(ft)	PAD Elevation(ft)
N: 239498.8500 E: 794005.0200	120.00	2441.50	2441.86	2443.89
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (feet)	Saturation	OVM (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				51–99		Silty Sand (SM) - Very fine grained with 25-35% silt, compact, dry, pink to reddish tan color, lithology remains the same between cemented zones. Lightly cemented zone, carbonate cement. Lightly cemented zone, carbonate cement. Silty Sand (SM) - Similar to above. Water level at 63 feet after 45 minutes Becomes damp below 64 feet. Saturated below 67 feet. Silty Sand (SM) - Similar to above. Silty Sand (SM) - Similar to above. Lightly cemented, sandstone. Clayey Silty Sand (SC/SM) - Shaley/clayey, red, "False Red Bed". Sandy Gravel (GW) - Well rounded to subrounded, chert and quartz, with 20% medium grained sand, multicolored, also limestone and shell fragments, granule to pebble sized.



WELL 01858 1/7/97

F-204A Austin (8-95)

Continued Next Page

WELL CONSTRUCTION LOG

WELL NO. RW-194

Client: FINA OIL AND CHEMICAL COMPANY	Start Date: 10-2-96	End Date: 10-2-96	Page 3 of 3
Site: BIG SPRING, TEXAS	Drilling Method: AIR/WET ROTARY		Project Number: 50-01858.16
Geologist: BRAD STOKES	Driller: CHOATE WELL SERVICE	Drill Rig Type: GARDNER DENVER 1500	Borehole Diameter: 7.88 Inches
Site Coordinates, UTM in ft.: N: 239498.8500 E: 794005.0200	Total Depth (ft-bgl): 120.00	Surface Elevation(ft) 2441.50	TOC Elevation(ft) 2441.86 / PAD Elevation(ft) 2443.89
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date: / Time:

Sample Type	Recovery (feet)	Saturation	OVM (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				101–106		Sandy Gravel (GW) - Well rounded to subrounded, chert and quartz, with 20% medium grained sand, multicolored, also limestone and shell fragments, granule to pebble sized. Large gravel, loosing circulation, no cuttings return.
				107–120		Silty Clay (CL) - Moderate plasticity with 15-20% silt in matrix, hard, dry, brick red color, Dockum Formation. Silty Clay (CL) - Similar to above.
				120		BORING TERMINATED AT 120 FEET BELOW GRADE

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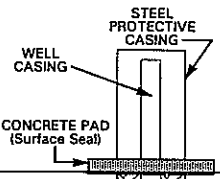
F-204A Austin (8-95)

WELL CONSTRUCTION LOG

WELL NO. RW-195

Client:		Start Date:	End Date:	Page of
FINA OIL AND CHEMICAL COMPANY		10-3-96	10-3-96	1 3
Site:		Drilling Method:		Project Number:
BIG SPRING, TEXAS		AIR/WET ROTARY		50-01858.16
Geologist:	Driller:	Drill Rig Type:		Borehole Diameter:
BRAD STOKES	CHOATE WELL SERVICE	GARDNER DENVER 1500		7.88 Inches
Site Coordinates, UTM in ft.:	Total Depth (ft-bgl):	Surface Elevation(ft)	TOC Elevation(ft)	PAD Elevation(ft)
N: 238360.1700 E: 793840.4600	100.00	2432.20	2434.41	2432.42
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (feet)	Saturation	OVM (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				1		Topsoil - Compact silty sand, dry to damp, brown.
				2 3		Clayey Sand (SC) - Low plasticity with 15-20% clay fines, damp, reddish brown to red color.
				4		Caliche
				5 6 7 8 9		Silty Sand (SM) - Very fine grained with 25-35% silt, compact, dry, pink to tan color with occasional lightly cemented seams throughout, lithology remains the same between cemented zones.
				10 11 12 13 14 15 16 17 18 19		Silty Sand (SM) - Similar to above. Some cemented zones from 10-20 feet.
				20 21 22 23 24 25 26 27 28 29		Silty Sand (SM) - Similar to above.
				30 31 32 33 34 35 36 37 38 39		Silty Sand (SM) - Similar to above.



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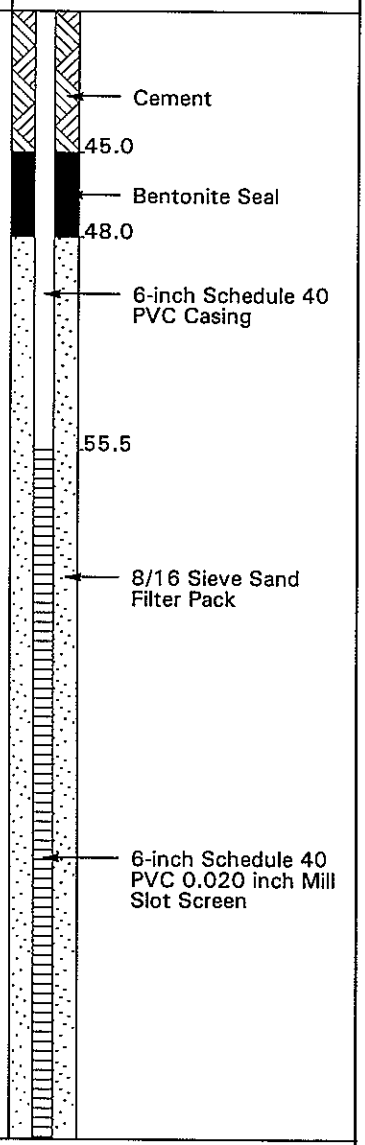
WELL CONSTRUCTION LOG

WELL NO. RW-195

Client: FINA OIL AND CHEMICAL COMPANY		Start Date: 10-3-96	End Date: 10-3-96	Page 2 of 3
Site: BIG SPRING, TEXAS		Drilling Method: AIR/WET ROTARY		Project Number: 50-01858.16
Geologist: BRAD STOKES	Driller: CHOATE WELL SERVICE	Drill Rig Type: GARDNER DENVER 1500		Borehole Diameter: 7.88 Inches
Site Coordinates, UTM in ft.: N: 238360.1700 E: 793840.4600	Total Depth (ft-bgl): 100.00	Surface Elevation(ft) 2432.20	TOC Elevation(ft) 2434.41	PAD Elevation(ft) 2432.42
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (feet)	Saturation	OVM (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				41–79		Silty Sand (SM) - Very fine grained with 25-35% silt, compact, dry, pink to tan color with occasional lightly cemented seams throughout, lithology remains the same between cemented zones. Cemented zones from 41 to 56 feet.
						Silty Sand (SM) - Similar to above.
						Silty Sand (SM) - Similar to above. Becomes damp below 61 feet, more cemented zones. Saturated below 63 feet, slight odor.
						Silty Sand (SM) - Similar to above.



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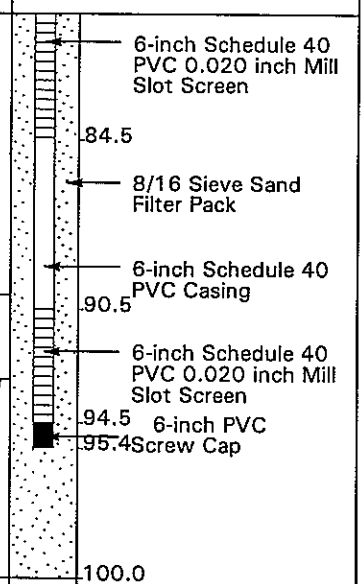
WELL CONSTRUCTION LOG

WELL NO. RW-195

Client: FINA OIL AND CHEMICAL COMPANY		Start Date: 10-3-96	End Date: 10-3-96	Page 3 of 3
Site: BIG SPRING, TEXAS		Drilling Method: AIR/WET ROTARY		Project Number: 50-01858.16
Geologist: BRAD STOKES	Driller: CHOATE WELL SERVICE	Drill Rig Type: GARDNER DENVER 1500		Borehole Diameter: 7.88 Inches
Site Coordinates, UTM in ft.: N: 238360.1700 E: 793840.4600	Total Depth (ft-bgl): 100.00	Surface Elevation(ft) 2432.20	TOC Elevation(ft) 2434.41	PAD Elevation(ft) 2432.42
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (feet)	Saturation	OVM (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				81–100		Silty Sand (SM) - Very fine grained with 25-35% silt, compact, dry, pink to tan color with occasional lightly cemented seams throughout, lithology remains the same between cemented zones.
				85–90		Clayey Silty Sand (SC/SM) - Clayey sand, red, "False Red Bed".
				90–93		Sandy Gravel (GW) - Well graded, granule to pebbled sized, chert, quartz, shells, limestone, with 35-45% fine to medium quartz sand, rounded, multicolored- tan, red, black, pink, white, about 10-15% granule sized, low sphericity (platy) shell material.
				96–100		Silty Clay (CL) - Moderate plasticity with 15-20% silt in matrix, hard, shaley texture, dry, brick red color, Dockum Formation.
				100		BORING TERMINATED AT 100 FEET BELOW GRADE



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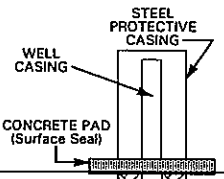
WELL CONSTRUCTION LOG

WELL NO. RW-196

Client: FINA OIL AND CHEMICAL COMPANY		Start Date: 10-3-96	End Date: 10-3-96	Page 1 of 3
Site: BIG SPRING, TEXAS		Drilling Method: AIR/WET ROTARY		Project Number: 50-01858.16
Geologist: BRAD STOKES	Driller: CHOATE WELL SERVICES	Drill Rig Type: GARDNER DENVER 1500		Borehole Diameter: 7.88 Inches
Site Coordinates, UTM in ft.: N: 238163.7700 E: 792920.5100	Total Depth (ft-bgl): 120.00	Surface Elevation(ft) 2438.00	TOC Elevation(ft) 2440.73	PAD Elevation(ft) 2438.49
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Depth (feet)	LITHOLOGIC DESCRIPTION
1–5	Top Soil - Silty sand(brown), and clayey sand(red).
3–5	Caliche
5–9	Silty Sand (SM) - Very fined grained with 25-35% silt in matrix, quartz sand, dry, compact, with occasional lightly cemented zone, pink to reddish tan.
9–11	Silty Sand (SM) - Similar to above.
13–15	Cemented zone.
19–21	Silty Sand (SM) - Similar to above.
21–23	Cemented zone.
30–32	Silty Sand (SM) - Similar to above. Cemented zone, carbonate cement, light tan color.
40–42	Silty Sand (SM) - Similar to above.



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WELL CONSTRUCTION LOG

WELL NO. RW-196

Client:		Start Date:	End Date:	Page of
FINA OIL AND CHEMICAL COMPANY		10-3-96	10-3-96	2 3
Site:		Drilling Method:		Project Number:
BIG SPRING, TEXAS		AIR/WET ROTARY		50-01858.16
Geologist:	Driller:	Drill Rig Type:		Borehole Diameter:
BRAD STOKES	CHOATE WELL SERVICES	GARDNER DENVER 1500		7.88 Inches
Site Coordinates, UTM in ft.:	Total Depth (ft-bgl):	Surface Elevation(ft)	TOC Elevation(ft)	PAD Elevation(ft)
N: 238163.7700 E: 792920.5100	120.00	2438.00	2440.73	2438.49
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type | Recovery (feet) | Saturation | OVM (ppm) | Depth (feet) | Stratigraphy

LITHOLOGIC DESCRIPTION

Silty Sand (SM) - Very fined grained with 25-35% silt in matrix, quartz sand, dry, compact, with occasional lightly cemented zone, light tan color.

Cemented zone.

Silty Sand (SM) - Similar to above.

Cemented zone, hard, damp.

Saturated below 68 feet, odor.

Silty Sand (SM) - Similar to above.

Silty Sand (SM) - Similar to above.

Clayey Silty Sand (SC/SM) - Clayey sand, red color, "False Red Bed".

Sandy Gravel (GW) - Granule to pebbled sized, rounded, quartz, chert, limestone shells, well graded, with 20-25%

Cement

54.0

Bentonite Seal

56.5

6-inch Schedule 40 PVC Casing

63.5

8/16 Sieve Sand Filter Pack

6-inch Schedule 40 PVC 0.020 inch Mill Slot Screen

92.5

8/16 Sieve Sand Filter Pack

6-inch Schedule 40 PVC Casing

98.5

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WELL NO. RW-196

Client:		Start Date:	End Date:	Page of
FINA OIL AND CHEMICAL COMPANY		10-3-96	10-3-96	3 3
Site:		Drilling Method:		Project Number:
BIG SPRING, TEXAS		AIR/WET ROTARY		50-01858.16
Geologist:	Driller:	Drill Rig Type:		Borehole Diameter:
BRAD STOKES	CHOATE WELL SERVICES	GARDNER DENVER 1500		7.88 Inches
Site Coordinates, UTM in ft.:	Total Depth (ft-bgl):	Surface Elevation(ft)	TOC Elevation(ft)	PAD Elevation(ft)
N: 238163.7700 E: 792920.5100	120.00	2438.00	2440.73	2438.49
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (feet)	Saturation	OVM (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				01–20		medium to fine quartz sand, multicolored shell fragments are platy.
				03–20		Silty Clay (CL) - Medium to low plasticity, dry, friable-shaley texture with 15-20% silt in matrix, brick red color, Dockum Formation.
				21		BORING TERMINATED AT 120 FEET BELOW GRADE

PVC Slot Screen

103.0
103.4 6-inch PVC Screw Cap

8/16 Sieve Sand Filter Pack

120.0

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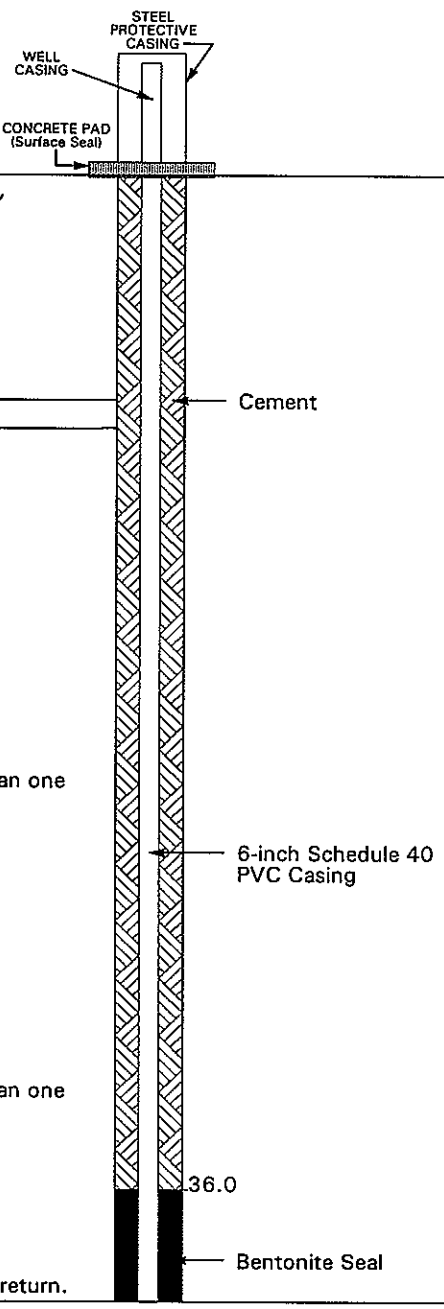
WELL CONSTRUCTION LOG

WELL NO. RW-197

Client: FINA OIL AND CHEMICAL COMPANY		Start Date: 10-7-96	End Date: 10-7-96	Page 1 of 3
Site: BIG SPRING, TEXAS		Drilling Method: AIR/MUD ROTARY		Project Number: 50-01858.16
Geologist: TRACY PAYNE	Driller: CHOATE WELL SERVICE	Drill Rig Type: GARDNER-DENVER 1500		Borehole Diameter: 12.25 Inches
Site Coordinates, UTM in ft.: N: 237968.1600 E: 792117.3900	Total Depth (ft-bgl): 100.00	Surface Elevation(ft) 2417.50	TOC Elevation(ft) 2419.37	PAD Elevation(ft) 2417.70
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (feet)	Saturation	OVM (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				1–8		Silty Sand (SM) - Very fine grained with 25-35% silt, compact, dry, pink to reddish tan.
				8–9	/// ≈ //	Caliche - Hard, dry, white.
				9–20		Silty Sand(SM) - Very fine grained with 20-35% silt, compact, dry, pink to tan. Silty Sand (SM) - Similar to above.
				20–30		Silty Sand (SM) - Similar as above. Lightly cemented sandstone seam at 21 feet; less than one foot in thickness.
				30–39		Silty Sand (SM) - Similar to above. Lightly cemented sandstone seam at 32 feet; less than one foot thick. Cemented SS seam at 39' with 1 in. pieces of SS in return.



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WELL CONSTRUCTION LOG

WELL NO. RW-197

Client: FINA OIL AND CHEMICAL COMPANY		Start Date: 10-7-96	End Date: 10-7-96	Page 2 of 3
Site: BIG SPRING, TEXAS		Drilling Method: AIR/MUD ROTARY		Project Number: 50-01858.16
Geologist: TRACY PAYNE	Driller: CHOATE WELL SERVICE	Drill Rig Type: GARDNER-DENVER 1500		Borehole Diameter: 12.25 Inches
Site Coordinates, UTM in ft.: N: 237968.1600 E: 792117.3900	Total Depth (ft-bgl): 100.00	Surface Elevation(ft) 2417.50	TOC Elevation(ft) 2419.37	PAD Elevation(ft) 2417.70
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type | Recovery (feet) | Saturation | OVM (ppm) | Depth (feet) | Stratigraphy

LITHOLOGIC DESCRIPTION

Silty Sand (SM) - Very fine grained with 20-35% silt, compact, dry, pink to tan, with occasional sandstone seams.

Silty Sand (SM) - Similar to above except damp at 50 feet increasing in moisture to 60 feet, white poorly cemented, odor at 50 feet

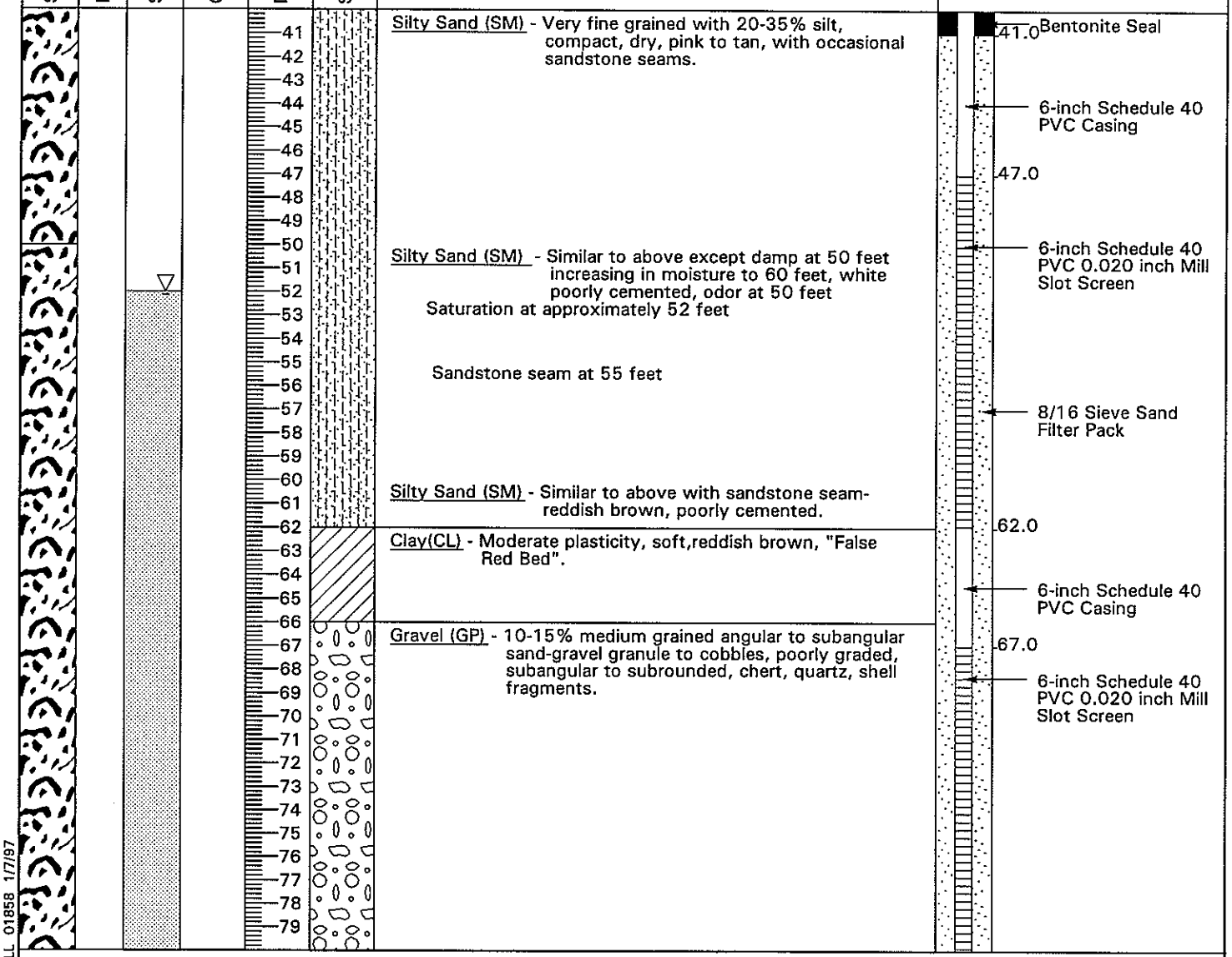
Saturation at approximately 52 feet

Sandstone seam at 55 feet

Silty Sand (SM) - Similar to above with sandstone seam- reddish brown, poorly cemented.

Clay(CL) - Moderate plasticity, soft,reddish brown, "False Red Bed".

Gravel (GP) - 10-15% medium grained angular to subangular sand-gravel granule to cobbles, poorly graded, subangular to subrounded, chert, quartz, shell fragments.



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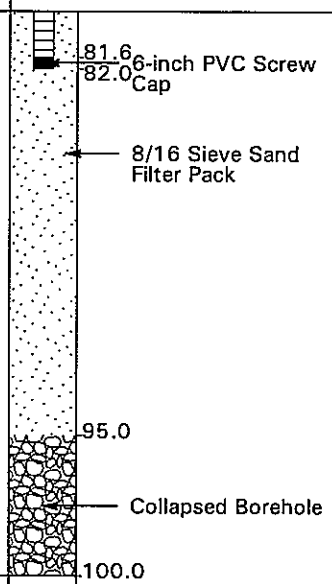
WELL CONSTRUCTION LOG

WELL NO. RW-197

Client: FINA OIL AND CHEMICAL COMPANY	Start Date: 10-7-96	End Date: 10-7-96	Page 3 of 3
Site: BIG SPRING, TEXAS	Drilling Method: AIR/MUD ROTARY		Project Number: 50-01858.16
Geologist: TRACY PAYNE	Driller: CHOATE WELL SERVICE	Drill Rig Type: GARDNER-DENVER 1500	Borehole Diameter: 12.25 Inches
Site Coordinates, UTM in ft.: N: 237968.1600 E: 792117.3900	Total Depth (ft-bgl): 100.00	Surface Elevation(ft) 2417.50 / TOC Elevation(ft) 2419.37	PAD Elevation(ft) 2417.70
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft): / Date:	Time:

Sample Type	Recovery (feet)	Saturation	OVM (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				81–100		Clay (CH) - Highly plastic, stiff, dry, red, Dockum Formation.
				90–100		Clay (CH) - Similar to above, shaley, very stiff.
				101		BORING TERMINATED AT 100 FEET BELOW GRADE



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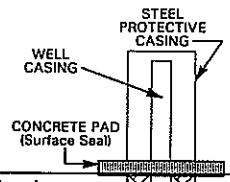
WELL CONSTRUCTION LOG

WELL NO. RW-198

Client: FINA OIL AND CHEMICAL COMPANY		Start Date: 10-8-96	End Date: 10-8-96	Page 1 of 3
Site: BIG SPRING, TEXAS		Drilling Method: AIR/MUD ROTARY		Project Number: 50-01858.16
Geologist: TRACY PAYNE	Driller: CHOATE WELL SERVICE	Drill Rig Type: GARDNER-DENVER 1500		Borehole Diameter: 12.25 Inches
Site Coordinates, UTM in ft.: N: 237508.4400 E: 790200.2900	Total Depth (ft-bgl): 100.00	Surface Elevation(ft) 2430.80	TOC Elevation(ft) 2433.13	PAD Elevation(ft) 2431.15
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (feet)	Saturation	OVM (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				1		Sandy Clay (CL) - Low plasticity, 20% very fine grained sand, firm, dry, brown.
				2		Silty Sand (SM) - Very fined grained with 25-35% silt, compact, dry, pink to light reddish tan.
				3		
				4		
				5		
				6		
				7		
				8		
				9		
				10		Silty Sand (SM) - Similar to above except darker reddish tan with occasional sandstone seams.
				11		
				12		
				13		
				14		
				15		Color changes to a very light tan
				16		
				17		
				18		
				19		
				20		Silty Sand (SM) - Similar to above, very fined grained with 25-35 % silt, color changes to a reddish tan, 5% caliche nodules/gravel, dry to damp.
				21		
				22		
				23		
				24		
				25		
				26		
				27		
				28		
				29		
				30		Silty Sand (SM) - Similar to above except silt decreases to 20%, sand grains very fine to fine, damp, compact.
				31		
				32		
				33		
				34		
				35		
				36		
				37		
				38		
				39		



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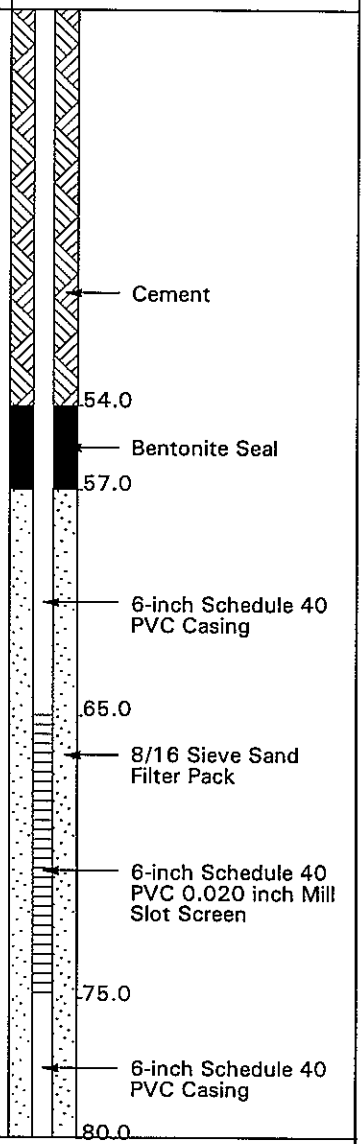
WELL CONSTRUCTION LOG

WELL NO. RW-198

Client: FINA OIL AND CHEMICAL COMPANY		Start Date: 10-8-96	End Date: 10-8-96	Page 2 of 3
Site: BIG SPRING, TEXAS		Drilling Method: AIR/MUD ROTARY		Project Number: 50-01858.16
Geologist: TRACY PAYNE	Driller: CHOATE WELL SERVICE	Drill Rig Type: GARDNER-DENVER 1500		Borehole Diameter: 12.25 Inches
Site Coordinates, UTM in ft.: N: 237508.4400 E: 790200.2900	Total Depth (ft-bgl): 100.00	Surface Elevation(ft) 2430.80	TOC Elevation(ft) 2433.13	PAD Elevation(ft) 2431.15
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (feet)	Saturation	OVM (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				41-79		Silty Sand (SM) - Very fined grained, 20% silt, very dense, reddish brown with occasional sandstone gravel, damp.
						Silty Sand (SM) - Similar to above.
						Sandstone seam at 56 feet; color changes light reddish tan, compact.
						Silty Sand (SM) - Similar to above, compact to dense.
						Sandstone seam at 64 feet; white, poorly cemented, (tan to light gray in color)
						Saturation at 68 feet
						Silty Sand (SM) - Similar to above with light gray in color and occasional sandstone seams, moist to saturated at 70 feet, dense to very dense.
						Sandstone at 75 feet (added water to help circulate cuttings)



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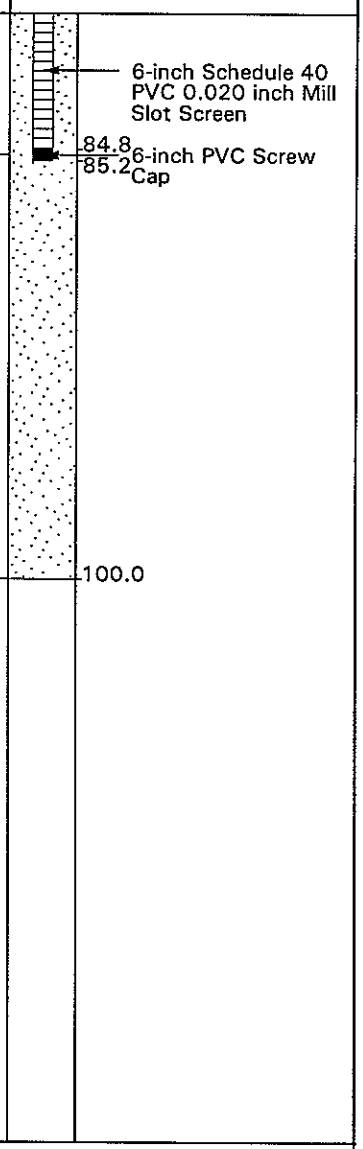
WELL CONSTRUCTION LOG

WELL NO. RW-198

Client: FINA OIL AND CHEMICAL COMPANY		Start Date: 10-8-96	End Date: 10-8-96	Page 3 of 3
Site: BIG SPRING, TEXAS		Drilling Method: AIR/MUD ROTARY		Project Number: 50-01858.16
Geologist: TRACY PAYNE	Driller: CHOATE WELL SERVICE	Drill Rig Type: GARDNER-DENVER 1500		Borehole Diameter: 12.25 Inches
Site Coordinates, UTM in ft.: N: 237508.4400 E: 790200.2900	Total Depth (ft-bgl): 100.00	Surface Elevation(ft) 2430.80	TOC Elevation(ft) 2433.13	PAD Elevation(ft) 2431.15
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (feet)	Saturation	OVM (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				81–85		Gravel (GP) - Angular to subrounded, loose, granule to large pebble, chert, quartz, shell fragments, poorly sorted, <15% coarse sand.
				85–100		Clay (CH) Highly plastic, shaley, firm, dry, red, Dockum Formation.
				100		BORING TERMINATED AT 100 FEET BELOW GRADE



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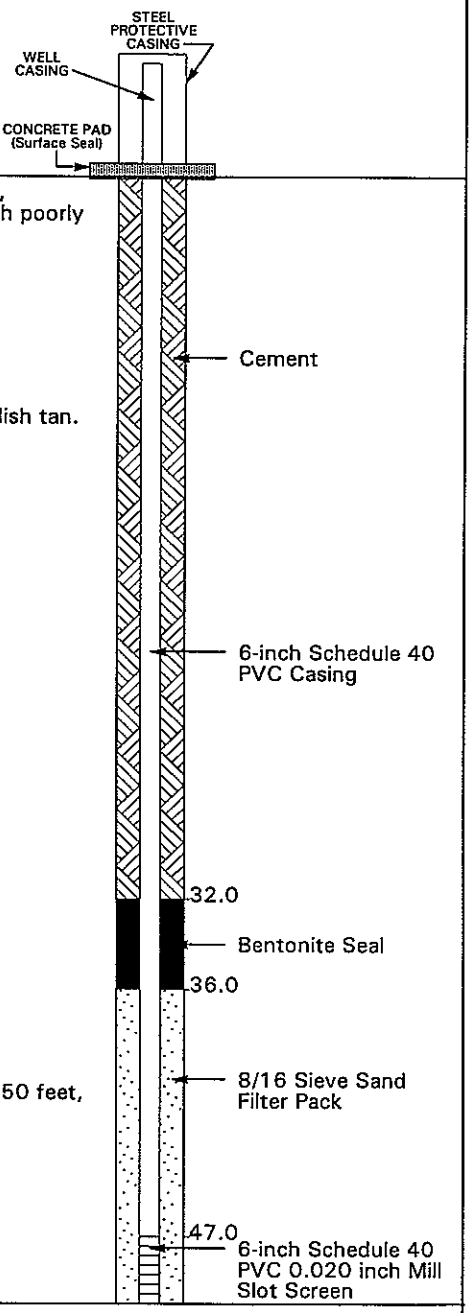
WELL CONSTRUCTION LOG

RMT INC.

WELL NO. RW-199

Client:		Start Date:	End Date:	Page of
FINA OIL AND CHEMICAL COMPANY		10-10-96	10-10-96	1 2
Site:		Drilling Method:		Project Number:
BIG SPRING, TEXAS		AIR/MUD ROTARY		50-01858.16
Geologist:	Driller:	Drill Rig Type:		Borehole Diameter:
TRACY PAYNE	CHOATE WELL SERVICE	GARDNER-DENVER 1500		12.25 Inches
Site Coordinates, UTM in ft.:	Total Depth (ft-bgl):	Surface Elevation(ft)	TOC Elevation(ft)	PAD Elevation(ft)
N: 237741.6900 E: 791037.9600	95.00	2419.80	2440.42	2420.13
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (feet)	Saturation	OVM (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				1-49		Silty Sand (SM) - Very fine grained with 20-30% silt, compact, dry, light reddish tan with poorly cemented nodules.
						Silty Sand (SM) - Similar to above except darker reddish tan.
						Silty Sand (SM) - Similar to above.
						Silty Sand (SM) - Similar to above.
						Damp at 35 feet
						Silty Sand (SM) - Similar to above, damp to moist at 50 feet, added water to circulate cuttings.



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WELL CONSTRUCTION LOG

WELL NO. RW-199

Client: FINA OIL AND CHEMICAL COMPANY		Start Date: 10-10-96	End Date: 10-10-96	Page 2 of 2
Site: BIG SPRING, TEXAS		Drilling Method: AIR/MUD ROTARY		Project Number: 50-01858.16
Geologist: TRACY PAYNE	Driller: CHOATE WELL SERVICE	Drill Rig Type: GARDNER-DENVER 1500		Borehole Diameter: 12.25 Inches
Site Coordinates, UTM in ft.: N: 237741.6900 E: 791037.9600	Total Depth (ft-bgl): 95.00	Surface Elevation(ft) 2419.80	TOC Elevation(ft) 2440.42	PAD Elevation(ft) 2420.13
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (feet)	Saturation	OVM (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				51–62		Silty Sand (SM) - Very fine grained with 20-30% silt, compact, dark reddish tan with poorly cemented nodules, saturation at 50 feet.
				60		Sandstone seam at 60 feet, saturated
				63–65		Clay (CH) - Moderately plastic, soft, reddish brown, "False Red Bed".
				66–70		Sand (SP) - Fine grained, loose, saturated, red.
				71–77		Gravelly Sand (GP) - Fine grained, loose, red, well sorted with 40-50% gravel- chert, quartz, angular, granule to pebble with larger pebbles at bottom.
				78–95		Clay (CH) - Highly plastic, stiff, dry, red, Dockum Formation.
				95		BORING TERMINATED AT 95 FEET BELOW GRADE

8/16 Sieve Sand Filter Pack

6-inch Schedule 40 PVC 0.020 inch Mill Slot Screen

67.0

6-inch Schedule 40 PVC Casing

72.0

6-inch Schedule 40 PVC 0.020 inch Mill Slot Screen

76.8

77.2 6-inch PVC Screw Cap

85.0

Collapsed Borehole

95.0

WELL 01858 1/7/97

F-204A Austin (8-95)

PHASE-SEPARATED HYDROCARBON RECOVERY WELL LOGS

RECOVERY WELL CONSTRUCTION

WELL NO. RW-106

CLIENT: FINA OIL & CHEMICAL COMPANY JOB NO: 019505.2 SHEET 1 OF 1

SITE: BIG SPRING, TEXAS DATE: START: Aug 25, 1992 FINISH: Aug 26, 1992

GEOLOGIST: James D. Shotwell DRILLER: Dusty Choate DRILLING RIG TYPE: Failing 1000

DRILLING METHODS: Air Rotary TOTAL DEPTH: 85 feet HOLE DIAMETER: 12.25 inches

SITE COORDINATES: 240132.80' N + 791443.67' E ELEVATIONS: GROUND: NA PAD: 2440.58' TOC: 2442.67' PROT. CSG: 2442.45

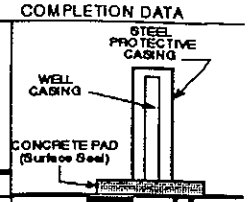
WATER LEVEL: DEPTH: 57.38 feet DATUM: TOC DATE: Aug. 26, 1992 TIME: 7:50 AM

JONES AND NEUSE, INC.
Environmental and Engineering Consultants

LITHOLOGIC DESCRIPTION

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION
0				SP		SAND uniform, fine grained, loose, red, dry.
10				SP		SAND as above.
20				SP		SAND as above.
30				SP		SAND as above.
40				SP		SAND as above.
50				SP		SAND as above.
60						Saturation @ 58 feet; Strong gasoline odor.
				SP		SAND as above, saturated, gasoline odor.
70				SP		SAND as above.
80				SP		SAND as above.
				SP		SAND as above.
90						Boring Terminated @ 85 feet below grade.
100						

COMPLETION DATA



(1) UNIFIED SOIL CLASSIFICATION SYSTEM

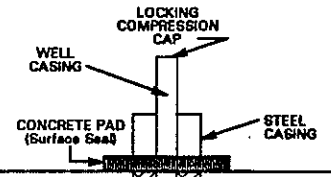
MW-STAND.WK3

WELL CONSTRUCTION LOG

WELL NO. RW-171

Client:		Start Date:	End Date:	Page of
FINA OIL AND CHEMICAL COMPANY		9-19-95	9-20-95	1 3
Site:		**Drilling Method:**		**Project Number:**
Big Spring, Texas		Air/Wet Rotary		50-00195.77
Geologist:	**Driller:**	**Drill Rig Type:**		**Borehole Diameter:**
Tracy Payne	Diversified/Powell	Mayhew 1000		14 Inches
Site Coordinates:	**Total Depth:**	**Surface Elevation (ft.):**	**TOC Elevation (ft.):**	**PAD Elevation (ft.):**
N: 240477.4400 E: 789515.3300	115.00	2459.49	2460.79	2459.74
Datum Description:	**Datum Elevation:**	**Water Level Depth Below TOC (ft):**	**Date:**	**Time:**
GRADE LEVEL				

Sample Type	Recovery (feet)	Saturation	Field Test S.C. (mS)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
X				1–9		Silty Sand (SM) - very fine grained, 40 % silt, poorly graded, loose, dry, tan, no odor.
X				10–19		Silty Sand (SM) - similar to above.
X				20–29		Silty Sand (SM) - similar to above, becomes reddish tan @ 25'.
X				30–39		Silty Sand (SM) - similar to above.
X				40–49		Silty Sand (SM) - similar to above.



16" ID Steel surface casing to 5' BGL

Cement/Bentonite Grout

8"ID Schedule 40 PVC riser

WELL 19577 12/12/95

F-204A Austin (8-95)

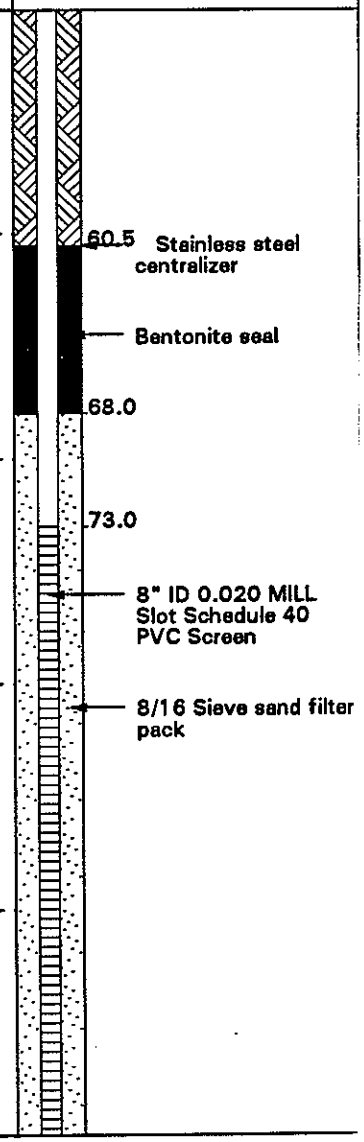
Continued Next Page

WELL CONSTRUCTION LOG

WELL NO. RW-171

Client: FINA OIL AND CHEMICAL COMPANY		Start Date: 9-19-95	End Date: 9-20-95	Page 2 of 3
Site: Big Spring, Texas		Drilling Method: Air/Wet Rotary		Project Number: 50-00195.77
Geologist: Tracy Payne	Driller: Diversified/Powell	Drill Rig Type: Mayhew 1000		Borehole Diameter: 14 Inches
Site Coordinates: N: 240477.4400 E: 789515.3300	Total Depth: 115.00	Surface Elevation (ft.): 2459.49	TOC Elevation (ft.): 2460.79	PAD Elevation (ft.): 2459.74
Datum Description: GRADE LEVEL	Datum Elevation:	Water Level Depth Below TOC (ft):	Date:	Time:

Sample Type	Recovery (feet)	Saturation	Field Test S.C. (mS)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				51–99		Silty Sand (SM) - very fine grained, 40% silt, poorly graded, loose, dry, reddish tan at 25 feet.
						Silty Sand (SM) - similar to above.
						Silty Sand (SM) - similar to above with hydrocarbon odor @ 70', satuation @ 78', soil discolored above saturation.
						Silty Sand (SM) - similar to above, saturated. with FREE-PHASE HYDROCARBON NOTED IN RETURN PIT.
						Silty Sand (SM) - similar to above.



WELL 19577 12/12/95

F-204A Austin (8-95)

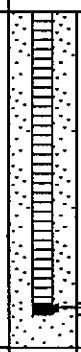
Continued Next Page

WELL CONSTRUCTION LOG

WELL NO. RW-171

Client: FINA OIL AND CHEMICAL COMPANY		Start Date: 9-19-95	End Date: 9-20-95	Page 3 of 3
Site: Big Spring, Texas		Drilling Method: Air/Wet Rotary		Project Number: 50-00195.77
Geologist: Tracy Payne	Driller: Diversified/Powell	Drill Rig Type: Mayhew 1000		Borehole Diameter: 14 Inches
Site Coordinates: N: 240477.4400 E: 789515.3300	Total Depth: 115.00	Surface Elevation (ft.): 2459.49	TOC Elevation (ft.): 2460.79	PAD Elevation (ft.): 2459.74
Datum Description: GRADE LEVEL	Datum Elevation:	Water Level Depth Below TOC (ft):	Date:	Time:

Sample Type	Recovery (feet)	Saturation	Field Test S.C. (mS)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
X				101–110		Silty Sand (SM) - 40% silt, poorly graded, loose, dry, reddish tan, coarse grained.
X				110–115		Sand (SP) - subangular, coarse, loose, saturated, moderately graded, grading to pebble-sized gravel.
				115–149		Clay Red Bed Dockum FM T.D. @ 115 feet



WELL 19577 12/12/95

F-204A Austin (8-95)

WELL CONSTRUCTION LOG

WELL NO. RW-173

Client: FINA OIL AND CHEMICAL COMPANY	Start Date: 9-5-95	End Date: 9-5-95	Page 1 of 3
Site: Big Spring, Texas	Drilling Method: Air/Wet Rotary		Project Number: 50-00195.77
Geologist: Tracy Payne	Driller: Diversified/Poewll	Drill Rig Type: Mayhew 1000	Borehole Diameter: 14 Inches
Site Coordinates: N: 240644.8300 E: 791178.8200	Total Depth: 120.00	Surface Elevation (ft.): 2455.27	TOC Elevation (ft.): 2456.26 / PAD Elevation (ft.): 2455.52
Datum Description: GRADE LEVEL	Datum Elevation:	Water Level Depth Below TOC (ft):	Date: / Time:

Sample Type | Recovery (feet) | Saturation | OVM (ppm) | Depth (feet) | Stratigraphy

LITHOLOGIC DESCRIPTION

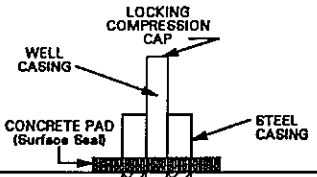
Silty Sand (SM) - very fine grained @ 30% silt, poorly graded, loose, dry, reddish brown, no odor.

Silty Sand (SM) - similar to above except 40% silt & reddish tan, no odor.

Silty Sand (SM) - similar to above.

Silty Sand (SM) - similar to above.

Silty Sand (SM) - similar to above.



10" ID Steel surface casing to 5'

Cement/Bentonite Grout

8"ID Schedule 40 PVC riser

48.0 Bentonite seal

WELL 19577 1/9/96

F-204A Austin (8-95)

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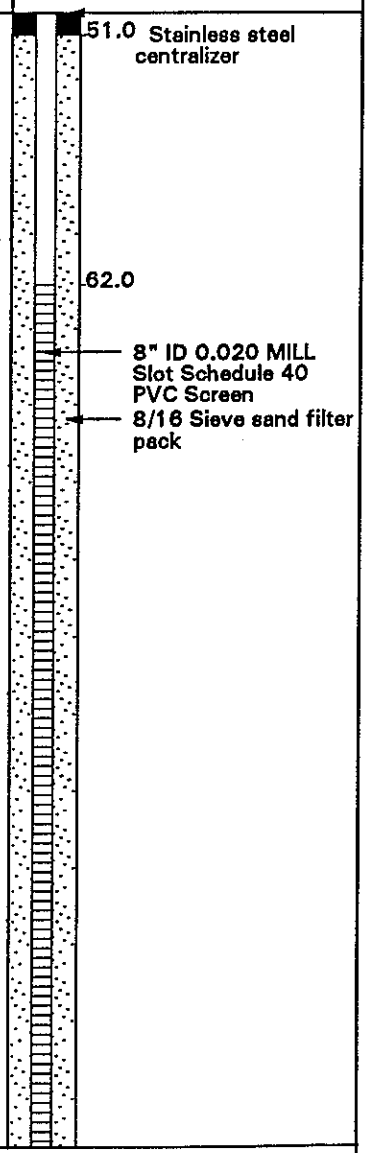
WELL CONSTRUCTION LOG

WELL NO. RW-173

Client:		Start Date:	End Date:	Page of
FINA OIL AND CHEMICAL COMPANY		9-5-95	9-5-95	2 3
Site:		Drilling Method:		Project Number:
Big Spring, Texas		Air/Wet Rotary		50-00195.77
Geologist:	Driller:	Drill Rig Type:		Borehole Diameter:
Tracy Payne	Diversified/Poewll	Mayhew 1000		14 Inches
Site Coordinates:	Total Depth:	Surface Elevation (ft.):	TOC Elevation (ft.):	PAD Elevation (ft.):
N: 240644.8300 E: 791178.8200	120.00	2455.27	2456.26	2455.52
Datum Description:	Datum Elevation:	Water Level Depth Below TOC (ft):	Date:	Time:
GRADE LEVEL				

Sample Type	Recovery (feet)	Saturation	OVM (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				51–59		Silty Sand (SM) - similar to above except odor @ 59' BGL, discolored.
				60–69		Silty Sand (SM) - similar to above, odor, sandstone @ 68' BGL Sat. @ 70'.
		▽		70–79		Silty Sand (SM) - similar to above, odor.
				80–89		Silty Sand (SM) - similar to above.
				90–99		Silty Sand (SM) - similar to above with ss seams.



WELL 19577 1/9/98

F-204A Austin (8-95)

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WELL CONSTRUCTION LOG

WELL NO. RW-173

Client: FINA OIL AND CHEMICAL COMPANY	Start Date: 9-5-95	End Date: 9-5-95	Page 3 of 3
Site: Big Spring, Texas	Drilling Method: Air/Wet Rotary		Project Number: 50-00195.77
Geologist: Tracy Payne	Driller: Diversified/Poewll	Drill Rig Type: Mayhew 1000	Borehole Diameter: 14 Inches
Site Coordinates: N: 240644.8300 E: 791178.8200	Total Depth: 120.00	Surface Elevation (ft.): 2455.27	TOC Elevation (ft.): 2456.26 / PAD Elevation (ft.): 2455.52
Datum Description: GRADE LEVEL	Datum Elevation:	Water Level Depth Below TOC (ft):	Date: / Time:

Sample Type	Recovery (feet)	Saturation	OVM (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				101–109		Silty Sand (SM) - similar to above.
				110–112		Geavel (GM) - pebble size with medium to coarse sand, mod. graded, reddish brown.
				113–115		Clay (CH) - false red bed.
				116–120		Gravel (GW) - med. to coarse gravel, rounded quartz and chert gravel, mod. graded.
				120–149		T.D.@ 120'

WELL 19577 1/9/96

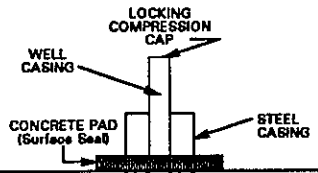
F-204A Austin (8-95)

WELL CONSTRUCTION LOG

WELL NO. RW-174

Client: FINA OIL AND CHEMICAL COMPANY	Start Date: 9-26-95	End Date: 9-26-95	Page 1 of 3
Site: Big Spring, Texas	Drilling Method: Air/Wet Rotary		Project Number: 50-00195.77
Geologist: Tracy Payne	Driller: Diversified/Powell	Drill Rig Type: Mayhew 1000	Borehole Diameter: 14 Inches
Site Coordinates: N: 240619.4200 E: 791499.7800	Total Depth: 100.00	Surface Elevation (ft.): 2453.46	TOC Elevation (ft.): 2454.49 / PAD Elevation (ft.): 2453.71
Datum Description: GRADE LEVEL	Datum Elevation:	Water Level Depth Below TOC (ft):	Date: / Time:

Sample Type	Recovery (feet)	Saturation	Field Test S.C. (mS)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
X				1–4		Clayey Sand (SC) - very fine to fine grained with 5-10% clay, dry, reddish brown, compact, no odor.
X				5–9		Silty Sand (SM) - very fine grained with 40% silt, poorly graded, loose, dry, light reddish tan, no odor.
X				10–19		Silty Sand (SM) - similar to above.
X				20–29		Silty Sand (SM) - similar to above.
X				30–39		Silty Sand (SM) - similar to above.
X				40–49		Silty Sand (SM) - similar to above.



16" ID Steel surface casing to 5'

Cement/Bentonite Grout

8"ID Schedule 40 PVC riser

WELL 19677 12/12/95

F-204A Austin (8-95)

Continued Next Page

WELL CONSTRUCTION LOG

WELL NO. RW-174

Client:		Start Date:	End Date:	Page of
FINA OIL AND CHEMICAL COMPANY		9-26-95	9-26-95	2 3
Site:		**Drilling Method:**		**Project Number:**
Big Spring, Texas		Air/Wet Rotary		50-00195.77
Geologist:	**Driller:**	**Drill Rig Type:**		**Borehole Diameter:**
Tracy Payne	Diversified/Powell	Mayhew 1000		14 Inches
Site Coordinates:	**Total Depth:**	**Surface Elevation (ft.):**	**TOC Elevation (ft.):**	**PAD Elevation (ft.):**
N: 240619.4200 E: 791499.7800	100.00	2453.46	2454.49	2453.71
Datum Description:	**Datum Elevation:**	**Water Level Depth Below TOC (ft):**	**Date:**	**Time:**
GRADE LEVEL				

Sample Type	Recovery (feet)	Saturation	Field Test S.C. (mS)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				51–59		Silty Sand (SM) - very fine grained, with 40% silt, poorly graded, loose, dry, light reddish tan, slight odor @ 50' BGL.
				60–69		Silty Sand (SM) - similar to above, strong odor @ 65' BGL, moist, occasional sand stone seams.
		▽		70–79		Silty Sand (SM) - similar to above, except saturation @ 75' BGL.
				80–89		Silty Sand (SM) - similar to above, sand stone seams @ 85-87', 88'. FREE-PHASE HYDROCARBON IN RETURN PIT.
				90–95		Silty Sand (SM) - similar to above, sand stone seams @ 91'.
				96–99		Clay (CH) - Dockum FM

61.0 Stainless steel centralizer
Bentonite seal
65.0
70.0
8" ID 0.020 MILL Slot Schedule 40 PVC Screen
8/16 Sieve sand filter pack
95.0
95.5 End Cap
100.0

WELL 19577 12/12/95

F-204A Austin (8-95)

Continued Next Page

WELL CONSTRUCTION LOG

WELL NO. RW-174

Client: FINA OIL AND CHEMICAL COMPANY		Start Date: 9-26-95	End Date: 9-26-95	Page 3 of 3
Site: Big Spring, Texas		Drilling Method: Air/Wet Rotary		Project Number: 50-00195.77
Geologist: Tracy Payne	Driller: Diversified/Powell	Drill Rig Type: Mayhew 1000		Borehole Diameter: 14 Inches
Site Coordinates: N: 240619.4200 E: 791499.7800	Total Depth: 100.00	Surface Elevation (ft.): 2453.46	TOC Elevation (ft.): 2454.49	PAD Elevation (ft.): 2453.71
Datum Description: GRADE LEVEL	Datum Elevation:	Water Level Depth Below TOC (ft):	Date:	Time:

Sample Type	Recovery (feet)	Saturation	Field Test S.C. (mS)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				101		T.D. @ 100'
				102		
				103		
				104		
				105		
				106		
				107		
				108		
				109		
				110		
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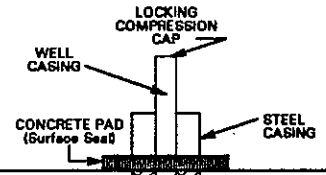
WELL CONSTRUCTION LOG

WELL NO. RW-175

Client: FINA OIL AND CHEMICAL COMPANY	Start Date: 9-27-95	End Date: 9-27-95	Page 1 of 3
Site: Big Spring, Texas	Drilling Method: Air/Wet Rotary		Project Number: 50-00195.77
Geologist: Tracy Payne / Driller: Diversified/Powell	Drill Rig Type: Mayhew 1000		Borehole Diameter: 14 Inches
Site Coordinates: N: 240652.3400 E: 791917.1300 / Total Depth: 100.00	Surface Elevation (ft.): 2433.78	TOC Elevation (ft.): 2434.90	PAD Elevation (ft.): 2434.03
Datum Description: GRADE LEVEL / Datum Elevation:	Water Level Depth Below TOC (ft):	Date:	Time:

Sample Type	Recovery (feet)	Saturation	Field Test S.C. (mS)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
X				1–9		Silty Sand (SM) - very fine grained with 40% silt, poorly graded, loose, dry, light reddish tan, no odor.
X				10–19		Silty Sand (SM) - similar to above.
X				20–29		Silty Sand (SM) - similar to above except 25-30% silt.
X				30–39		Silty Sand (SM) - similar to above, slight odor @ 35' BGL, strong odor @ 40' BGL.
X				40–49		Silty Sand (SM) - similar to above.



16" ID Steel surface casing to 5'

Cement/Bentonite Grout

8"ID Schedule 40 PVC riser

39.0 Stainless steel centralizer

Bentonite seal 43.0

48.0

WELL 19677 12/12/95

F-204A Austin (8-95)

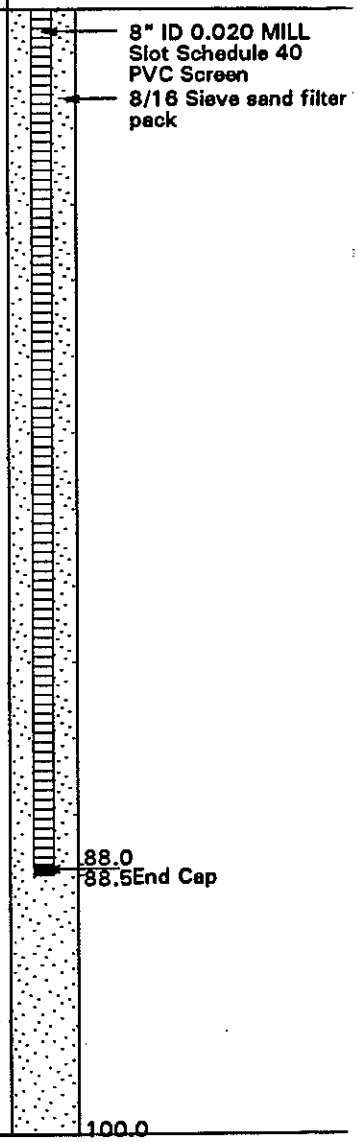
Continued Next Page

WELL CONSTRUCTION LOG

WELL NO. RW-175

Client: FINA OIL AND CHEMICAL COMPANY	Start Date: 9-27-95	End Date: 9-27-95	Page 2 of 3
Site: Big Spring, Texas	Drilling Method: Air/Wet Rotary		Project Number: 50-00195.77
Geologist: Tracy Payne	Driller: Diversified/Powell	Drill Rig Type: Mayhew 1000	Borehole Diameter: 14 Inches
Site Coordinates: N: 240652.3400 E: 791917.1300	Total Depth: 100.00	Surface Elevation (ft.): 2433.78	TOC Elevation (ft.): 2434.90 / PAD Elevation (ft.): 2434.03
Datum Description: GRADE LEVEL	Datum Elevation:	Water Level Depth Below TOC (ft):	Date: / Time:

Sample Type	Recovery (feet)	Saturation	Field Test S.C. (mS)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
		▽		51–59		Silty Sand (SM) - very fine grained, with 25-30% silt, poorly graded, loose, light reddish tan, moist @ 50' saturated @ 53' with strong odor.
				60–69		Silty Sand (SM) - similar to above.
				70–79		Silty Sand (SM) - similar to above, reddish brown, sand stone seams @ 71-73' BGL, FREE-PHASE HYDROCARBON IN RETURN PIT.
				80–89		Silty Sand (SM) - similar to above, sand stone seam @ 85-87' BGL.
				90–94		Silty Sand (SM) - similar to above with sand stone seam @ 91'.
				95–99		Clay (CH) - Dockum FM



WELL 18577 12/12/95

F-204A Austin (8-95)

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WELL CONSTRUCTION LOG

WELL NO. RW-175

Client: FINA OIL AND CHEMICAL COMPANY	Start Date: 9-27-95	End Date: 9-27-95	Page 3 of 3
Site: Big Spring, Texas	Drilling Method: Air/Wet Rotary		Project Number: 50-00195.77
Geologist: Tracy Payne / Driller: Diversified/Powell	Drill Rig Type: Mayhew 1000		Borehole Diameter: 14 Inches
Site Coordinates: N: 240652.3400 E: 791917.1300 / Total Depth: 100.00	Surface Elevation (ft.): 2433.78	TOC Elevation (ft.): 2434.90	PAD Elevation (ft.): 2434.03
Datum Description: GRADE LEVEL / Datum Elevation:	Water Level Depth Below TOC (ft):	Date:	Time:

Sample Type	Recovery (feet)	Saturation	Field Test S.C. (mS)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				101		T.D. @ 100'
				102		
				103		
				104		
				105		
				106		
				107		
				108		
				109		
				110		
				111		
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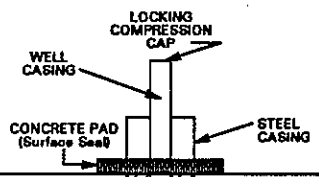
				147		
				148		
				149		

WELL CONSTRUCTION LOG

WELL NO. RW-176

Client:		Start Date:	End Date:	Page of
FINA OIL AND CHEMICAL COMPANY		9-28-95	9-28-95	1 3
Site:		**Drilling Method:**		**Project Number:**
Big Spring, Texas		Air/Wet Rotary		50-00195.77
Geologist:	**Driller:**	**Drill Rig Type:**		**Borehole Diameter:**
Tracy Payne	Diversified/Powell	Mayhew 1000		14 Inches
Site Coordinates:	**Total Depth:**	**Surface Elevation (ft.):**	**TOC Elevation (ft.):**	**PAD Elevation (ft.):**
N: 240596.0200 E: 790719.9000	103.00	2444.31	2445.46	2444.56
Datum Description:	**Datum Elevation:**	**Water Level Depth Below TOC (ft):**	**Date:**	**Time:**
GRADE LEVEL				

Sample Type	Recovery (feet)	Saturation	Field Test S.C. (mS)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
X				1–9		Silty Sand (SM) - very fine grained with 30% silt, poorly graded, loose, dry, light reddish tan, no odor.
X				10–19		Silty Sand (SM) - similar to above, damp.
X				20–29		Silty Sand (SM) - similar to above except fine grained, 20% silt, damp.
X				30–39		Silty Sand (SM) - similar to above, dry.
X				40–49		Silty Sand (SM) - similar to above.



16" ID Steel surface casing to 5'

Cement/Bentonite Grout

8"ID Schedule 40 PVC riser

49.0 Stainless steel

WELL 19577 12/12/96

F-204A Austin (8-95)

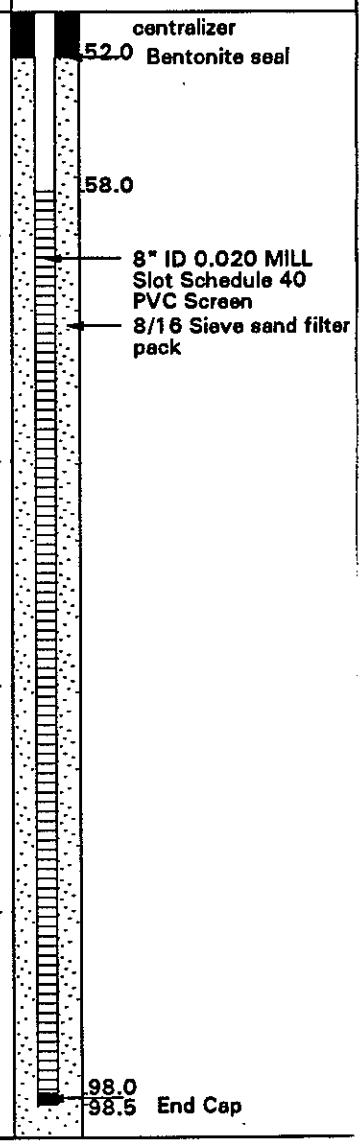
Continued Next Page

WELL CONSTRUCTION LOG

WELL NO. RW-176

Client:		Start Date:	End Date:	Page of
FINA OIL AND CHEMICAL COMPANY		9-28-95	9-28-95	2 3
Site:		**Drilling Method:**		**Project Number:**
Big Spring, Texas		Air/Wet Rotary		50-00195.77
Geologist:	**Driller:**	**Drill Rig Type:**		**Borehole Diameter:**
Tracy Payne	Diversified/Powell	Mayhew 1000		14 Inches
Site Coordinates:	**Total Depth:**	**Surface Elevation (ft.):**	**TOC Elevation (ft.):**	**PAD Elevation (ft.):**
N: 240596.0200 E: 790719.9000	103.00	2444.31	2445.46	2444.56
Datum Description:	**Datum Elevation:**	**Water Level Depth Below TOC (ft):**	**Date:**	**Time:**
GRADE LEVEL				

Sample Type	Recovery (feet)	Saturation	Field Test S.C. (mS)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
X				51-59		Silty Sand (SM) - fine grained, 20% silt, poorly graded, loose, dry, light reddish tan, slight odor.
X		▽		60-69		Silty Sand (SM) - similar to above, strong odor @ 60', saturation @ 63' BGL, reddish brown.
X				70-79		Silty Sand (SM) - similar to above sand stone seams @ 76' to 79'. Small amount of emulsion noted in return pit- no free phase.
X				80-89		Silty Sand (SM) - similar to above, sand stone seam @ 86' BGL, 1 foot thick.
X				90-99		Silty Sand (SM) - similar to above.



WELL 19577 12/12/95

F-204A Austin (8-95)

Continued Next Page

WELL CONSTRUCTION LOG

WELL NO. RW-176

Client: FINA OIL AND CHEMICAL COMPANY	Start Date: 9-28-95	End Date: 9-28-95	Page 3 of 3
Site: Big Spring, Texas	Drilling Method: Air/Wet Rotary		Project Number: 50-00195.77
Geologist: Tracy Payne	Driller: Diversified/Powell	Drill Rig Type: Mayhew 1000	Borehole Diameter: 14 Inches
Site Coordinates: N: 240596.0200 E: 790719.9000	Total Depth: 103.00	Surface Elevation (ft.): 2444.31	TOC Elevation (ft.): 2445.46
Datum Description: GRADE LEVEL	Datum Elevation:	Water Level Depth Below TOC (ft):	Date: / Time:

Sample Type	Recovery (feet)	Saturation	Field Test S.C. (mS)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				101		
				102		
				103		T.D. @ 103'
				104		
				105		
				106		
				107		
				108		
				109		
				110		
				111		
				112		
				113		
				114		
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				139		
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				141		
				142		
				143		
				144		
				145		
				146		
				147		
				148		
				149		

103.0

WELL 19577 12/12/95

F-204A Austin (8-95)

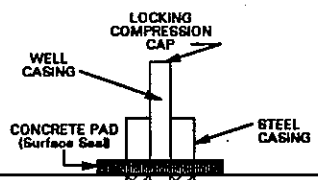
WELL CONSTRUCTION LOG

WELL NO. RW-177

Client: FINA OIL AND CHEMICAL COMPANY	Start Date: 9-29-95	End Date: 9-29-95	Page 1 of 2
Site: Big Spring, Texas	Drilling Method: Air/Wet Rotary		Project Number: 50-00195.77
Geologist: Tracy Payne / Driller: Diversified/Powell	Drill Rig Type: Mayhew 1000		Borehole Diameter: 14 Inches
Site Coordinates: N: 239920.3800 E: 791428.4000 / Total Depth: 80.00	Surface Elevation (ft.): 2433.10	TOC Elevation (ft.): 2434.41	PAD Elevation (ft.): 2433.35
Datum Description: GRADE LEVEL / Datum Elevation:	Water Level Depth Below TOC (ft):	Date:	Time:

Sample Type | Recovery (feet) | Saturation | Field Test S.C. (mS) | Depth (feet) | Stratigraphy

LITHOLOGIC DESCRIPTION



Silty Sand (SM) - very fine grained, poorly graded, 30- 40% silt, reddish tan, dry, no odor.

Silty Sand (SM) - similar to above.

Silty Sand (SM) - similar to above, increase of reddish tint.

Silty Sand (SM) - similar to above.

Silty Sand (SM) - similar to above, slight odor @ 47' BGL, discolored.

16" ID Steel surface casing to 5'

Cement/Bentonite Grout

8"ID Schedule 40 PVC riser

39.0 Stainless steel centralizer

Bentonite seal

43.0

48.0

WELL 13577 12/12/95

F-204A Austin (8-95)

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WELL CONSTRUCTION LOG

WELL NO. RW-177

Client: FINA OIL AND CHEMICAL COMPANY	Start Date: 9-29-95	End Date: 9-29-95	Page 2 of 2
Site: Big Spring, Texas	Drilling Method: Air/Wet Rotary		Project Number: 50-00195.77
Geologist: Tracy Payne	Driller: Diversified/Powell	Drill Rig Type: Mayhew 1000	Borehole Diameter: 14 Inches
Site Coordinates: N: 239920.3800 E: 791428.4000	Total Depth: 80.00	Surface Elevation (ft.): 2433.10	TOC Elevation (ft.): 2434.41 / PAD Elevation (ft.): 2433.35
Datum Description: GRADE LEVEL	Datum Elevation:	Water Level Depth Below TOC (ft):	Date: / Time:

Sample Type | Recovery (feet) | Saturation | Field Test S.C. (mS) | Depth (feet) | Stratigraphy

LITHOLOGIC DESCRIPTION

Silty Sand (SM) - very fine grained, poorly graded, 30-40% silt, reddish tan, strong odor @ 52' saturation @ 53'.

Silty Sand (SM) - similar to above, sandstone seams @ 65-67', 69-70', strong odor.

Silty Sand (SM) - similar to above, occasional sandstone seams.

Clay (CH) - false red bed.

T.D. @ 80'

8" ID 0.020 MILL Slot Schedule 40 PVC Screen

8/16 Sieve sand filter pack

78.0

78.5 End Cap

80.0

WELL 19577 12/12/95

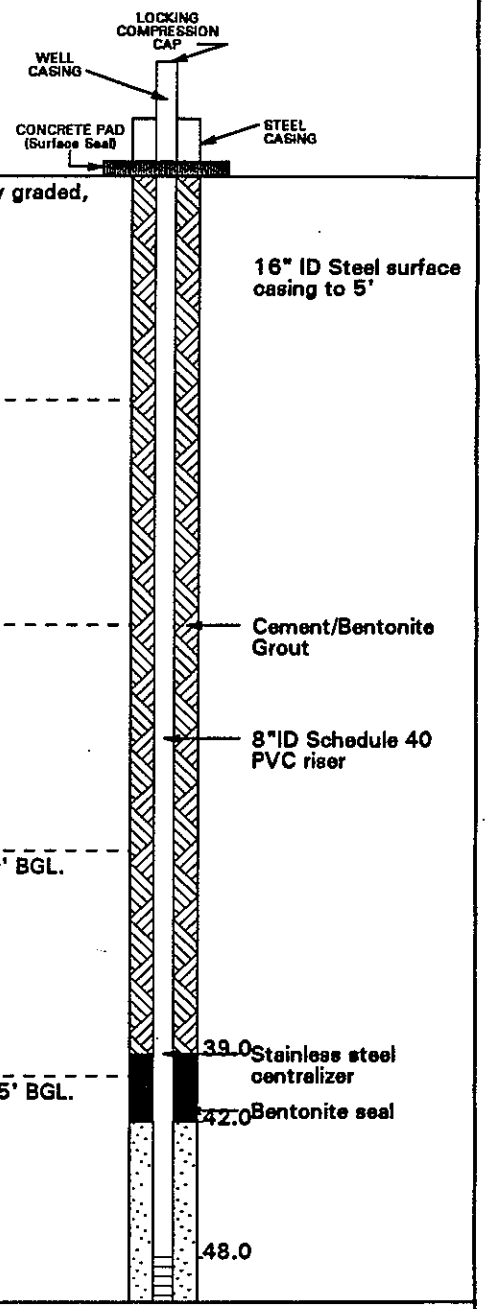
F-204A Austin (8-95)

WELL CONSTRUCTION LOG

WELL NO. RW-178

Client:		Start Date:	End Date:	Page of
FINA OIL AND CHEMICAL COMPANY		9-30-95	9-30-95	1 2
Site:		**Drilling Method:**		**Project Number:**
Big Spring, Texas		Air/ Wet Rotary		50-00195.77
Geologist:	**Driller:**	**Drill Rig Type:**		**Borehole Diameter:**
Tracy Payne	Diversified/Powell	Mayhew 1000		14 Inches
Site Coordinates:	**Total Depth:**	**Surface Elevation (ft.):**	**TOC Elevation (ft.):**	**PAD Elevation (ft.):**
N:- 240538.6800 E: 790328.5300	95.00	2436.18	2437.65	2436.43
Datum Description:	**Datum Elevation:**	**Water Level Depth Below TOC (ft):**	**Date:**	**Time:**
GRADE LEVEL				

Sample Type	Recovery (feet)	Saturation	Field Test S.C. (mS)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
X				1–9		Silty Sand (SM) - very fine grained, 40% silt, poorly graded, loose, dry, reddish brown, no odor.
X				10–19		Silty Sand (SM) - similar to above, reddish tan.
X				20–29		Silty Sand (SM) - similar to above.
X				30–39		Silty Sand (SM) - similar to above, slight odor @ 40' BGL.
X				40–49		Silty Sand (SM) - similar to above, strong odor @ 45' BGL.



WELL 19677 12/12/95

F-204A Austin (8-95)

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WELL CONSTRUCTION LOG

WELL NO. RW-178

Client: FINA OIL AND CHEMICAL COMPANY	Start Date: 9-30-95	End Date: 9-30-95	Page 2 of 2
Site: Big Spring, Texas	Drilling Method: Air/ Wet Rotary		Project Number: 50-00195.77
Geologist: Tracy Payne	Driller: Diversified/Powell	Drill Rig Type: Mayhew 1000	Borehole Diameter: 14 Inches
Site Coordinates: N: 240538.6800 E: 790328.5300	Total Depth: 95.00	Surface Elevation (ft.): 2436.18	TOC Elevation (ft.): 2437.65 / PAD Elevation (ft.): 2436.43
Datum Description: GRADE LEVEL	Datum Elevation:	Water Level Depth Below TOC (ft):	Date: / Time:

Sample Type	Recovery (feet)	Saturation	Field Test S.C. (mS)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
		▽		51–59		Silty Sand (SM) - very fine grained, 40% silt, poorly graded, very strong odor with saturation @ 53' BGL, discolored soil @ 50', gray color.
				60–69		Silty Sand (SM) - similar to above, occasional sandstone seams, FREE- PHASE HYDROCARBON NOTED IN RETURN PIT.
				70–79		Silty Sand (SM) - similar to above.
				80–87		Silty Sand (SM) - similar to above.
				88–94		Gravelly Sand (SW) - well graded, subangular gravel, granule to pebble sized, chert, increasing gravel content with depth, fine-medium sand, subangular.
				95–99		Total Depth 95' BGL

8" ID 0.020 MILL Slot Schedule 40 PVC Screen

8/16 Sieve sand filter pack

88.0

88.5 End Cap

95.0

WELL 19577 12/12/95

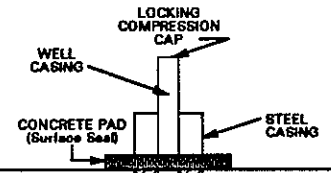
F-204A Austin (8-95)

WELL CONSTRUCTION LOG

WELL NO. RW-179

Client: FINA OIL AND CHEMICAL COMPANY	Start Date: 10-1-95	End Date: 10-1-95	Page 1 of 2
Site: Big Spring, Texas	Drilling Method: Air/ Wet Rotary		Project Number: 50-00195.77
Geologist: Tracy Payne	Driller: Diversified/Powell	Drill Rig Type: Mayhew 1000	Borehole Diameter: 14 Inches
Site Coordinates: N: 240641.6300 E: 792300.0700	Total Depth: 80.00	Surface Elevation (ft.): 2433.50	TOC Elevation (ft.): 2434.75 / PAD Elevation (ft.): 2433.75
Datum Description: GRADE LEVEL	Datum Elevation:	Water Level Depth Below TOC (ft): / Date: / Time:	

Sample Type	Recovery (feet)	Saturation	Field Test S.C. (mS)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
X				1–9		Silty Sand (SM) - very fine grained, 30-40% silt, poorly graded, loose, dry, reddish brown, no odor.
X				10–19		Silty Sand (SM) - similar to above, reddish tan.
X				20–29		Silty Sand (SM) - similar to above.
X				30–39		Silty Sand (SM) - similar to above, faint odor @ 35' BGL, increasing in intensity with depth.
X				40–49		Silty Sand (SM) - similar to above, very strong odor @ 45' BGL saturation @ 48'.



16" ID Steel surface casing to 5'

Cement/Bentonite Grout

8"ID Schedule 40 PVC riser

33.0 Stainless steel centralizer

Bentonite seal

36.0

43.0

8" ID 0.020 MILL Slot Schedule 40 PVC Screen

WELL 19677 12/12/95

F-204A Austin (8-95)

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WELL CONSTRUCTION LOG

WELL NO. RW-179

Client: FINA OIL AND CHEMICAL COMPANY	Start Date: 10-1-95	End Date: 10-1-95	Page 2 of 2
Site: Big Spring, Texas	Drilling Method: Air/ Wet Rotary		Project Number: 50-00195.77
Geologist: Tracy Payne	Driller: Diversified/Powell	Drill Rig Type: Mayhew 1000	Borehole Diameter: 14 Inches
Site Coordinates: N: 240641.6300 E: 792300.0700	Total Depth: 80.00	Surface Elevation (ft.): 2433.50	TOC Elevation (ft.): 2434.75 / PAD Elevation (ft.): 2433.75
Datum Description: GRADE LEVEL	Datum Elevation:	Water Level Depth Below TOC (ft): / Date:	Time:

Sample Type	Recovery (feet)	Saturation	Field Test S.C. (mS)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
X				51–59		Silty Sand (SM) - very fine grained, 30-40% silt, poorly graded, loose, reddish brown, with sandstone seams, emulsified oil in return pit.
X				60–69		Silty Sand (SM) - similar to above.
X				70–75		Silty Sand (SM) - similar to above.
				76–79		Clay (CH) - False Red Bed.
				80–99		Borehole Terminated at a depth of 80 feet BGL

8/16 Sieve sand filter pack

73.0 End Cap

73.5

80.0

WELL 19577 12/12/95

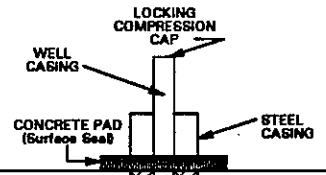
F-204A Austin (8-95)

WELL CONSTRUCTION LOG

WELL NO. RW-180

Client:		Start Date:	End Date:	Page of
FINA OIL AND CHEMICAL COMPANY		10-2-95	10-2-95	1 3
Site:		Drilling Method:		Project Number:
Big Spring, Texas		Air/ Wet Rotary		50-00195.77
Geologist:	Driller:	Drill Rig Type:		Borehole Diameter:
Tracy Payne	Diversified/Powell	Mayhew 1000		14 Inches
Site Coordinates:	Total Depth:	Surface Elevation (ft.):	TOC Elevation (ft.):	PAD Elevation (ft.):
N: 241118.2700 E: 790803.4600	100.00	2455.49	2456.72	2455.74
Datum Description:	Datum Elevation:	Water Level Depth Below TOC (ft):	Date:	Time:
GRADE LEVEL				

Sample Type	Recovery (feet)	Saturation	Field Test S.C. (mS)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
X				1-9		Silty Sand (SM) - very fine grained, poorly graded, loose, tan, slight odor, damp - 30% silt.
X				10-19		Silty Sand (SM) - similar to above with sandstone seams, odor.
X				20-29		Silty Sand (SM) - similar to above, discolored 20-25' BGL, odor.
X				30-34		Sand (SP) - fine grained, poorly graded, loose, subangular, <10% silt, tan, odor.
X				35-39		Silty Sand (SM) - very fine grained, poorly graded, 30% silt, loose, light reddish brown, odor.
X				40-49		Silty Sand (SM) - similar to above except tan, occasional sandstone seam, odor.



16" ID Steel surface casing to 5'

Cement/Bentonite Grout

8"ID Schedule 40 PVC riser

WELL 18577 12/12/95

F-204A Austin (8-95)

Continued Next Page

WELL CONSTRUCTION LOG

WELL NO. RW-180

Client: FINA OIL AND CHEMICAL COMPANY	Start Date: 10-2-95	End Date: 10-2-95	Page 2 of 3
Site: Big Spring, Texas	Drilling Method: Air/ Wet Rotary		Project Number: 50-00195.77
Geologist: Tracy Payne	Driller: Diversified/Powell	Drill Rig Type: Mayhew 1000	Borehole Diameter: 14 Inches
Site Coordinates: N: 241118.2700 E: 790803.4600	Total Depth: 100.00	Surface Elevation (ft.): 2455.49	TOC Elevation (ft.): 2456.72
Datum Description: GRADE LEVEL	Datum Elevation:	Water Level Depth Below TOC (ft):	Date: / Time:

Sample Type	Recovery (feet)	Saturation	Field Test S.C. (mS)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				51-59		Silty Sand (SM) - very fine grained, poorly graded, 30% silt, tan, odor.
				60-69		Silty Sand (SM) - similar to above, discolored @ 60', strong odor @ 65' BGL, saturation @ 68' BGL.
				70-79		Silty Sand (SM) - similar to above, decreasing silt content.
				80-89		Silty Sand (SM) - similar to above with sandstone seams throughout.
				90-97		Silty Sand (SM) - similar to above.
				98-99		Clay (CH) - FALSE RED BED. T.D. @ 100 feet BGL

53.0 Stainless steel centralizer
Bentonite seal
56.0
62.0
8" ID 0.020 MILL Slot Schedule 40 PVC Screen
8/16 Sieve sand filter pack
97.0
97.5 End Cap
100.0

WELL 19577 12/12/96

F-204A Austin (8-95)

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WELL CONSTRUCTION LOG

WELL NO. RW-180

Client: FINA OIL AND CHEMICAL COMPANY		Start Date: 10-2-95	End Date: 10-2-95	Page 3 of 3
Site: Big Spring, Texas		Drilling Method: Air/ Wet Rotary		Project Number: 50-00195.77
Geologist: Tracy Payne	Driller: Diversified/Powell	Drill Rig Type: Mayhew 1000		Borehole Diameter: 14 Inches
Site Coordinates: N: 241118.2700 E: 790803.4600	Total Depth: 100.00	Surface Elevation (ft.): 2455.49	TOC Elevation (ft.): 2456.72	PAD Elevation (ft.): 2455.74
Datum Description: GRADE LEVEL	Datum Elevation:	Water Level Depth Below TOC (ft):	Date:	Time:

Sample Type	Recovery (feet)	Saturation	Field Test S.C. (mS)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				101		T.D. @ 100'
				102		EMULSIFIED OIL NOTED IN PIT
				103		
				104		
				105		
				106		
				107		
				108		
				109		
				110		
				111		
				112		
				113		
				114		
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				145		
				146		
				147		
				148		
				149		

WELL 19577 12/12/96

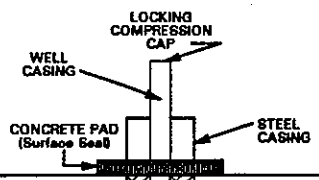
F-204A Austin (8-95)

WELL CONSTRUCTION LOG

WELL NO. RW-181

Client: FINA OIL AND CHEMICAL COMPANY	Start Date: 10-4-95	End Date: 10-4-95	Page 1 of 3
Site: Big Spring, Texas	Drilling Method: Air/ Wet Rotary		Project Number: 50-00195.77
Geologist: James Maly	Driller: Diversified/Powell	Drill Rig Type: Mayhew 1000	Borehole Diameter: 14 Inches
Site Coordinates: N: 241476.2000 E: 790714.7800	Total Depth: 105.00	Surface Elevation (ft.): 2456.70	TOC Elevation (ft.): 2457.78 / PAD Elevation (ft.): 2456.95
Datum Description: GRADE LEVEL	Datum Elevation:	Water Level Depth Below TOC (ft): / Date: / Time:	

Sample Type	Recovery (feet)	Saturation	Field Test S.C. (mS)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
X				1–7		Silty Sand (SM) - mostly fine grained, poorly graded, loose, reddish brown, slight odor, damp, 25-30% silt with minor amounts of plastic clay (15-20%).
X				8–9		Silty Sand (SM) - very fine, poorly graded, loose, tan, strong odor, decreasing clay content (<10%).
				10–19		Silty Sand (SM) - similar to above, odor, no clay (<5%).
X				20–29		Silty Sand (SM) - similar to above, odor.
X				30–33		Silty Sand (SM) - similar to above, odor.
X				34–39		Silty Sand (SM) - similar to above, except reddish brown with odor.
X				40–49		Silty Sand (SM) - similar to above, except tan with sandstone seams, dryer than above, odor.



16" ID Steel surface casing to 5'

Cement/Bentonite Grout

8"ID Schedule 40 PVC riser

WELL 19577 12/12/95

F-204A Austin (8-95)

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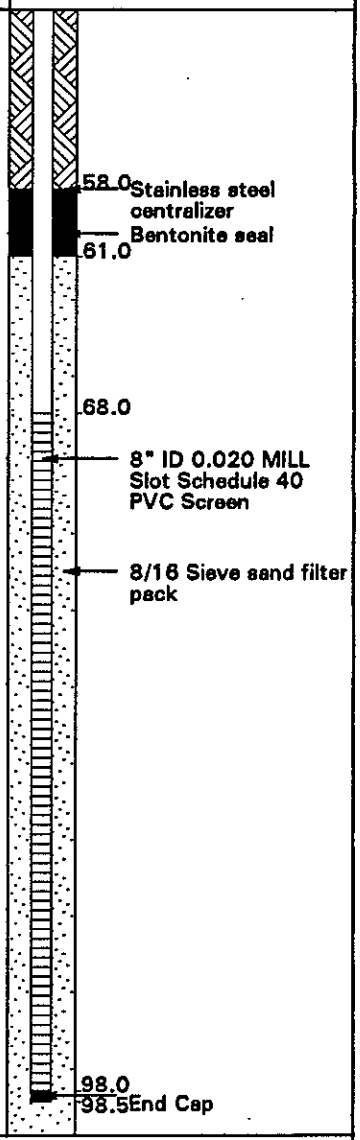
WELL CONSTRUCTION LOG

WELL NO. RW-181

Client:		Start Date:	End Date:	Page of
FINA OIL AND CHEMICAL COMPANY		10-4-95	10-4-95	2 3
Site:		Drilling Method:		Project Number:
Big Spring, Texas		Air/ Wet Rotary		50-00195.77
Geologist:	Driller:	Drill Rig Type:		Borehole Diameter:
James Maly	Diversified/Powell	Mayhew 1000		14 Inches
Site Coordinates:	Total Depth:	Surface Elevation (ft.):	TOC Elevation (ft.):	PAD Elevation (ft.):
N: 241476.2000 E: 790714.7800	105.00	2456.70	2457.78	2456.95
Datum Description:	Datum Elevation:	Water Level Depth Below TOC (ft):	Date:	Time:
GRADE LEVEL				

Sample Type	Recovery (feet)	Saturation	Field Test S.C. (mS)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				51–59		Silty Sand (SM) - very fine grained, poorly graded, loose, tan, odor, damp, increasing sandstone seams.
				60–69		Silty Sand (SM) - similar to above, strong odor, moist, reddish brown @ 63'.
				70–79		Silty Sand (SM) - similar to above, saturated @ 73' decreasing silt content (15-20%), 5-10% clay.
				80–89		Silty Sand (SM) - similar to above with dark gray (discolored) sandstone seam and strong odor @ 85-90'.
				90–99		Silty Sand (SM) - similar to above with dark gray sandstone seam and strong odor @ 95-98'.



WELL 19577 12/12/95

F-204A Austin (8-95)

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WELL CONSTRUCTION LOG

WELL NO. RW-181

Client: FINA OIL AND CHEMICAL COMPANY	Start Date: 10-4-95	End Date: 10-4-95	Page 3 of 3
Site: Big Spring, Texas	Drilling Method: Air/ Wet Rotary		Project Number: 50-00195.77
Geologist: James Maly	Driller: Diversified/Powell	Drill Rig Type: Mayhew 1000	Borehole Diameter: 14 Inches
Site Coordinates: N: 241476.2000 E: 790714.7800	Total Depth: 105.00	Surface Elevation (ft.): 2456.70	TOC Elevation (ft.): 2457.78 / PAD Elevation (ft.): 2456.95
Datum Description: GRADE LEVEL	Datum Elevation:	Water Level Depth Below TOC (ft):	Date: / Time:

Sample Type	Recovery (feet)	Saturation	Field Test S.C. (mS)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				101		Silty Sand (SM) - similar to above.
				102		
				103		
				104		
				105		Clay (CH) - Dockum FM. 105.0
				106		T.D. @ 105' BGL
				107		EMULSIFIED OIL NOTED IN RETURN PIT
				108		
				109		
				110		
				111		
				112		
				113		
				114		
				115		
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				147		
				148		
				149		

WELL 19577 12/12/95

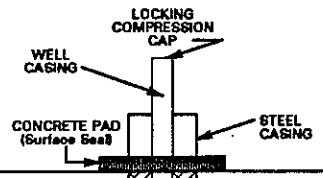
F-204A Austin (8-95)

WELL CONSTRUCTION LOG

WELL NO. RW-182

Client: FINA OIL AND CHEMICAL COMPANY	Start Date: 10-5-95	End Date: 10-5-95	Page 1 of 3
Site: Big Spring, Texas	Drilling Method: Air/ Wet Rotary		Project Number: 50-00195.77
Geologist: James Maly	Driller: Diversified/Powell	Drill Rig Type: Mayhew 1000	Borehole Diameter: 14 Inches
Site Coordinates: N: 241774.8900 E: 790639.9800	Total Depth: 100.00	Surface Elevation (ft.): 2453.99	TOC Elevation (ft.): 2455.20 / PAD Elevation (ft.): 2454.24
Datum Description: GRADE LEVEL	Datum Elevation:	Water Level Depth Below TOC (ft):	Date: / Time:

Sample Type	Recovery (feet)	Saturation	Field Test S.C. (mS)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
X				1–9		Silty Sand (SM) - mostly fine graded, poorly graded, loose, tan, slight odor, damp, 25-30% silt, <10% clay.
X				10–19		Silty Sand (SM) - similar to above except gray discoloration, slight odor.
X				20–24		Silty Sand (SM) - similar to above, except reddish brown with thin sandstone seams.
X				25–29		Silty Sand (SM) - similar ato above, odor.
X				30–39		Sandy Silt (ML) - non-plastic, 15-20% fine sand, soft, damp, odor, pinkish tan, sandstone seams.
X				40–49		Sandy Silt (ML) - similar to above, odor.



16" ID Steel surface casing to 5'

Cement/Bentonite Grout

8"ID Schedule 40 PVC riser

49.0 Stainless steel

WELL 19577 12/12/95

F-204A Austin (8-95)

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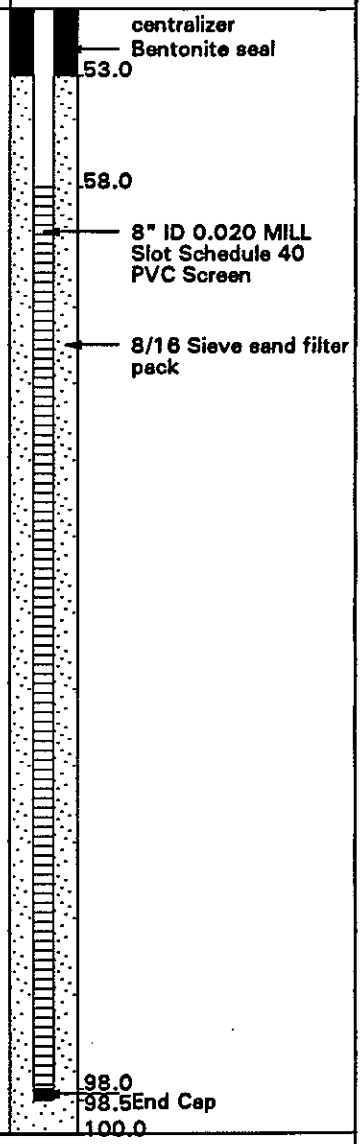
WELL CONSTRUCTION LOG

WELL NO. RW-182

Client: FINA OIL AND CHEMICAL COMPANY	Start Date: 10-5-95	End Date: 10-5-95	Page 2 of 3
Site: Big Spring, Texas	Drilling Method: Air/ Wet Rotary		Project Number: 50-00195.77
Geologist: James Maly	Driller: Diversified/Powell	Drill Rig Type: Mayhew 1000	Borehole Diameter: 14 Inches
Site Coordinates: N: 241774.8900 E: 790639.9800	Total Depth: 100.00	Surface Elevation (ft.): 2453.99	TOC Elevation (ft.): 2455.20	PAD Elevation (ft.): 2454.24
Datum Description: GRADE LEVEL	Datum Elevation:	Water Level Depth Below TOC (ft):	Date:	Time:

Sample Type	Recovery (feet)	Saturation	Field Test S.C. (mS)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				51–59		Sandy Silt (ML) - non-plastic, 15-20% fine sand, soft, damp, odor, pinkish tan, sandstone seams,odor.
				60–64		Silty Sand (SM) - very fine sand, poorly graded, loose, reddish brown, strong odor, moist, sandstone seams.
				65–69		Silty Sand (SM) - similar to above, strong odor, saturated @ 66'.
				70–79		Silty Sand (SM) - similar to above, strong odor, emulsified product in return pit.
				80–86		Silty Sand (SM) - similar to above, strong odor.
				87–90		Silty Sand (SM) - similar to above, except dark gray discolored sediments and gray return fluid with emulsified product - very strong odor.
				91–97		Silty Sand (SM) - similar to above, except reddish brown.
				98–99		Clay (CH) - bed Dockum FM.



WELL 19577 12/12/95

F-204A Austin (8-95)

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WELL CONSTRUCTION LOG

WELL NO. RW-182

Client: FINA OIL AND CHEMICAL COMPANY	Start Date: 10-5-95	End Date: 10-5-95	Page 3 of 3
Site: Big Spring, Texas	Drilling Method: Air/ Wet Rotary		Project Number: 50-00195.77
Geologist: James Maly	Driller: Diversified/Powell	Drill Rig Type: Mayhew 1000	Borehole Diameter: 14 Inches
Site Coordinates: N: 241774.8900 E: 790639.9800	Total Depth: 100.00	Surface Elevation (ft.): 2453.99	TOC Elevation (ft.): 2455.20 / PAD Elevation (ft.): 2454.24
Datum Description: GRADE LEVEL	Datum Elevation:	Water Level Depth Below TOC (ft):	Date: / Time:

Sample Type	Recovery (feet)	Saturation	Field Test S.C. (mS)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				101–149		T.D. @ 100' BGL EMULSIFIED PRODUCT IN RETURN PIT

WELL 19577 12/12/95

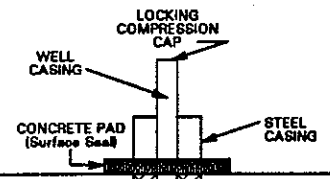
F-204A Austin (8-95)

WELL CONSTRUCTION LOG

WELL NO. RW-183

Client: FINA OIL AND CHEMICAL COMPANY	Start Date: 10-6-95	End Date: 10-6-95	Page 1 of 3
Site: Big Spring, Texas	Drilling Method: Air/Wet Rotary		Project Number: 50-00195.77
Geologist: James Maly	Driller: Diversified/Powell	Drill Rig Type: Mayhew 1000	Borehole Diameter: 14 Inches
Site Coordinates: N: 242153.9100 E: 790557.6200	Total Depth: 107.00	Surface Elevation (ft.): 2461.45	TOC Elevation (ft.): 2462.50 / PAD Elevation (ft.): 2461.70
Datum Description: GRADE LEVEL	Datum Elevation:	Water Level Depth Below TOC (ft): / Date: / Time:	

Sample Type	Recovery (feet)	Saturation	Field Test S.C. (mS)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
X				1–9		Sandy Silt (ML) - non-plastic, 10-15% fine sand, soft, damp, slight odor, pinkish tan with calcareous nodules (caliche).
X				10–19		Silty Sand (SM) - mostly fine, poorly graded, loose, tan, slight odor, damp, 20-25% silt.
X				20–29		Silty Sand (SM) - similar to above, slight odor.
X				30–39		Sandy Silt (ML) - non-plastic, 15-20% fine sand, soft, damp, odor, pinkish tan with sandstone seams.
X				40–49		Sandy Silt (ML) - similar to above, odor.



16" ID Steel surface casing to 5'

Cement/Bentonite Grout

8"ID Schedule 40 PVC riser

49.0 Stainless steel

WELL 19677 12/12/95

F-204A Austin (8-95)

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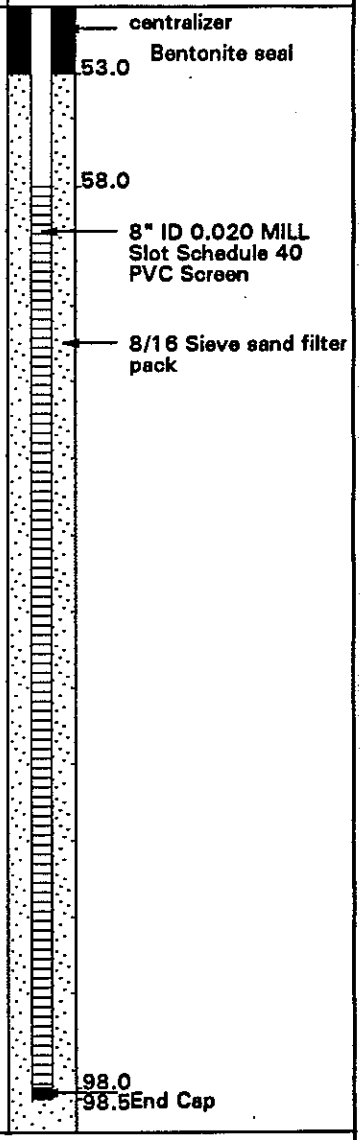
WELL CONSTRUCTION LOG

WELL NO. RW-183

Client: FINA OIL AND CHEMICAL COMPANY	Start Date: 10-6-95	End Date: 10-6-95	Page 2 of 3
Site: Big Spring, Texas	Drilling Method: Air/Wet Rotary		Project Number: 50-00195.77
Geologist: James Maly	Driller: Diversified/Powell	Drill Rig Type: Mayhew 1000	Borehole Diameter: 14 Inches
Site Coordinates: N: 242153.9100 E: 790557.6200	Total Depth: 107.00	Surface Elevation (ft.): 2461.45	TOC Elevation (ft.): 2462.50 / PAD Elevation (ft.): 2461.70
Datum Description: GRADE LEVEL	Datum Elevation:	Water Level Depth Below TOC (ft):	Date: / Time:

Sample Type	Recovery (feet)	Saturation	Field Test S.C. (mS)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				51–99		Sandy Silt (ML) - non-plastic, 15-20% fine sand, damp, soft, odor, pinkish tan with sandstone seams, odor.
				60–69		Silty Sand (SM) - mostly fine, poorly graded, loose, tan, strong odor, damp, 20-25% silt, saturated @ ~69'.
				70–79		Silty Sand (SM) - similar to above, strong odor, sandstone seams.
				80–89		Silty Sand (SM) - similar to above with poorly indurated calcareous sandstone seams, odor.
				90–99		Silty Sand (SM) - similar to above with <10% sub-angular and rounded coarse sand (2-3mm diameter).



WELL 19577 12/12/95

F-204A Austin (8-95)

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WELL CONSTRUCTION LOG

WELL NO. RW-183

Client: FINA OIL AND CHEMICAL COMPANY	Start Date: 10-6-95	End Date: 10-6-95	Page 3 of 3
Site: Big Spring, Texas	Drilling Method: Air/Wet Rotary		Project Number: 50-00195.77
Geologist: James Maly	Driller: Diversified/Powell	Drill Rig Type: Mayhew 1000	Borehole Diameter: 14 Inches
Site Coordinates: N: 242153.9100 E: 790557.6200	Total Depth: 107.00	Surface Elevation (ft.): 2461.45	TOC Elevation (ft.): 2462.50	PAD Elevation (ft.): 2461.70
Datum Description: GRADE LEVEL	Datum Elevation:	Water Level Depth Below TOC (ft):	Date:	Time:

Sample Type	Recovery (feet)	Saturation	Field Test S.C. (mS)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				101–107		Silty Sand (SM) - mostly fine, poorly graded, loose, tan, 20-25% silt, with <10% subangular and rounded coarse sand 2-3mm diameter, odor.
				103–105		Sandy Clay (CL) - moderately plastic, 15-20% fine sand, 20-25% silt, firm, saturated, tan w/ calcareous partings.
				106–107		Gravelly Sand (SP) - fine gravel and fine to coarse sand, gap graded, sub-angular, and rounded quartz grains (2-5mm diameter) 10-15% fine gravel, musticolored and clear grains.
						Product in pit
						BOREHOLE TERMINATED AT 107' BELOW GRADE

107.0

WELL 19577 12/12/95

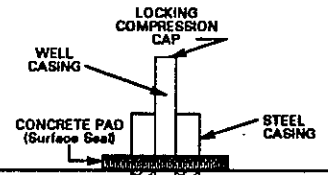
F-204A Austin (8-95)

WELL CONSTRUCTION LOG

WELL NO. RW-184

Client:		Start Date:	End Date:	Page of
FINA OIL AND CHEMICAL COMPANY		10-7-95	10-7-95	1 3
Site:		**Drilling Method:**		**Project Number:**
Big Spring, Texas		Air\Wet Rotary		50-00195.77
Geologist:	**Driller:**	**Drill Rig Type:**		**Borehole Diameter:**
James Maly	Diversified/Powell	Mayhew 1000		14 Inches
Site Coordinates:	**Total Depth:**	**Surface Elevation (ft.):**	**TOC Elevation (ft.):**	**PAD Elevation (ft.):**
N: 241611.8600 E: 792267.2600	106.00	2460.05	2461.00	2460.30
Datum Description:	**Datum Elevation:**	**Water Level Depth Below TOC (ft):**	**Date:**	**Time:**
GRADE LEVEL				

Sample Type	Recovery (feet)	Saturation	Field Test S.C. (mS)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
X				1–5		Silty Sand (SM) - mostly fine, poorly graded, loose, reddish brown, no odor, damp, 25-30% silt
				6–9		Sandy Silt (ML) - non-plastic, 10-15% fine sand, soft, damp, slight odor, tan, calcareous partings (caliche).
X				10–19		Sandy Silt (ML) - similar to above, slight odor.
X				20–29		Sandy Silt (ML) - similar to above, with sandstone seams.
X				30–39		Silty Sand (SM) - mostly fine, poorly graded, loose, tan, damp, odor, 25-30% silt.
X				40–49		Sandy Silt (ML) - non-plastic, 10-15% fine sand, soft, damp, odor, pinkish tan, with sandstone seams.



16" ID Steel surface casing to 5'

Cement/Bentonite Grout

8"ID Schedule 40 PVC riser

49.0 Stainless steel

WELL 19577 12/12/95

F-204A Austin (8-95)

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WELL CONSTRUCTION LOG

WELL NO. RW-184

Client:		Start Date:	End Date:	Page of
FINA OIL AND CHEMICAL COMPANY		10-7-95	10-7-95	2 3
Site:		**Drilling Method:**		**Project Number:**
Big Spring, Texas		Air\Wet Rotary		50-00195.77
Geologist:	**Driller:**	**Drill Rig Type:**		**Borehole Diameter:**
James Maly	Diversified/Powell	Mayhew 1000		14 Inches
Site Coordinates:	**Total Depth:**	**Surface Elevation (ft.):**	**TOC Elevation (ft.):**	**PAD Elevation (ft.):**
N: 241611.8600 E: 792267.2600	106.00	2460.05	2461.00	2460.30
Datum Description:	**Datum Elevation:**	**Water Level Depth Below TOC (ft):**	**Date:**	**Time:**
GRADE LEVEL				

Sample Type | Recovery (feet) | Saturation | Field Test S.C. (mS) | Depth (feet) | Stratigraphy

LITHOLOGIC DESCRIPTION

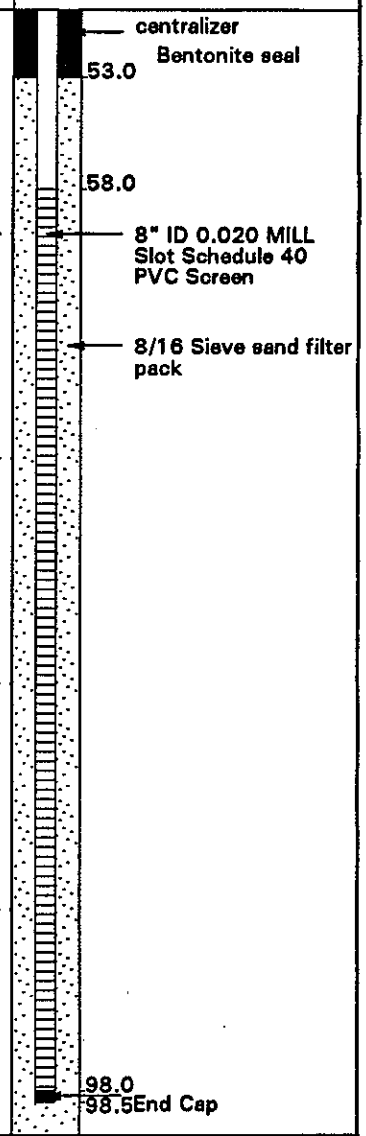
Sandy Silt (ML) - non-plastic, 10-15% fine sand, soft,damp, odor, pinkish, tan, with sandstone seams, odor.

Sandy Silt (ML) - similar to above, odor, sand content increasing to 25-30%, saturated @ 68'.

Silty Sand (SM) - mostly fine, poorly graded, loose, tan, damp, strong odor, 15-20% silt with sandstone seams.

Silty Sand (SM) - similar to above, with sandstone seams.

Gravelly sand (SP) - fine and medium sized gravel with coarse sand and sandstone seams, subangular and rounded quartz grains, multi-colored with dark black hydrocarbon staining and residue, gap graded, 10-15% fine and medium gravel.



WELL 19577 12/12/95

F-204A Austin (8-95)

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WELL CONSTRUCTION LOG

WELL NO. RW-184

Client: FINA OIL AND CHEMICAL COMPANY	Start Date: 10-7-95	End Date: 10-7-95	Page 3 of 3
Site: Big Spring, Texas	Drilling Method: Air\Wet Rotary		Project Number: 50-00195.77
Geologist: James Maly	Driller: Diversified/Powell	Drill Rig Type: Mayhew 1000	Borehole Diameter: 14 Inches
Site Coordinates: N: 241611.8600 E: 792267.2600	Total Depth: 106.00	Surface Elevation (ft.): 2460.05	TOC Elevation (ft.): 2461.00 / PAD Elevation (ft.): 2460.30
Datum Description: GRADE LEVEL	Datum Elevation:	Water Level Depth Below TOC (ft):	Date: / Time:

Sample Type	Recovery (feet)	Saturation	Field Test S.C. (mS)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				101–105		Gravelly Sand (SP) - similar to above.
				105–106		False Clay (CH) - Dockum FM. Oily product in pit.
				106		BOREHOLE TERMINATED AT 106' BELOW GRADE

106.0

WELL 19577 12/12/95

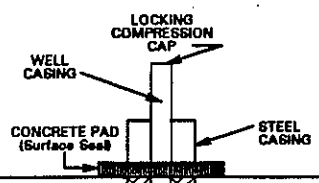
F-204A Austin (8-95)

WELL CONSTRUCTION LOG

WELL NO. RW-185

Client:		Start Date:	End Date:	Page of
FINA OIL AND CHEMICAL COMPANY		10-9-95	10-9-95	1 3
Site:		**Drilling Method:**		**Project Number:**
Big Spring, Texas		Air/Wet Rotary		50-00195.77
Geologist:	**Driller:**	**Drill Rig Type:**		**Borehole Diameter:**
James Maly	Diversified/Powell	Mayhew 1000		14 Inches
Site Coordinates:	**Total Depth:**	**Surface Elevation (ft.):**	**TOC Elevation (ft.):**	**PAD Elevation (ft.):**
N: 241106.8400 E: 791931.8700	106.00	2453.24	2454.18	2452.29
Datum Description:	**Datum Elevation:**	**Water Level Depth Below TOC (ft):**	**Date:**	**Time:**
GRADE LEVEL				

Sample Type	Recovery (feet)	Saturation	Field Test S.C. (mS)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
X				1–4		Silty Sand (SM) - poorly graded, fine, loose, reddish brown, slight odor, damp, 25-30% silt
X				5–9		SILTY SAND (SM) - similar to above except tan, slight odor.
X				10–19		SANDY SILT (ML) - non-plastic, 15-20% sand, soft, damp, pinkish tan, calcareous nodules, slight odor.
X				20–29		SANDY SILT (ML) - similar to above with calcareous seams, slight odor.
X				30–39		SANDY SILT (ML) - similar to above with sandstone seams.
X				40–49		SANDY SILT (ML) - similar to above with sandstone seams, odor.



16" ID Steel surface casing to 5'

Cement/Bentonite Grout

8"ID Schedule 40 PVC riser

47.0 Bentonite seal

Stainless steel centralizer

50.0

WELL 19577 12/12/95

F-204A Austin (8-95)

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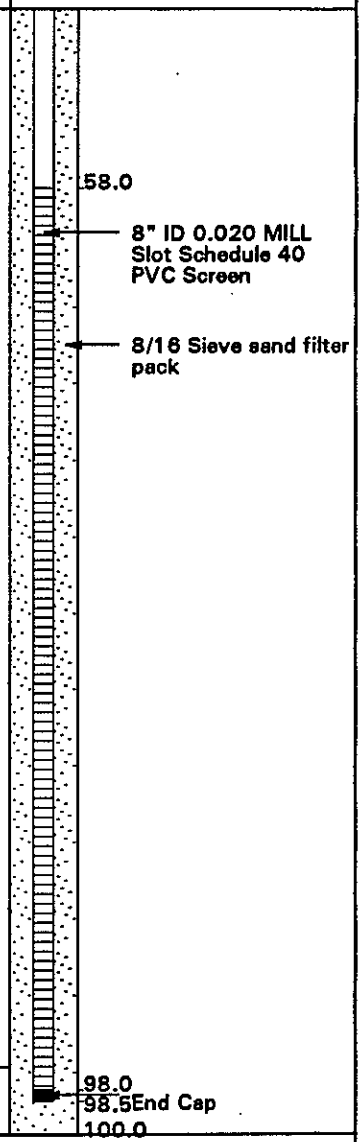
WELL CONSTRUCTION LOG

WELL NO. RW-185

Client:		Start Date:	End Date:	Page of
FINA OIL AND CHEMICAL COMPANY		10-9-95	10-9-95	2 3
Site:		**Drilling Method:**		**Project Number:**
Big Spring, Texas		Air/Wet Rotary		50-00195.77
Geologist:	**Driller:**	**Drill Rig Type:**		**Borehole Diameter:**
James Maly	Diversified/Powell	Mayhew 1000		14 Inches
Site Coordinates:	**Total Depth:**	**Surface Elevation (ft.):**	**TOC Elevation (ft.):**	**PAD Elevation (ft.):**
N: 241106.8400 E: 791931.8700	106.00	2453.24	2454.18	2452.29
Datum Description:	**Datum Elevation:**	**Water Level Depth Below TOC (ft):**	**Date:**	**Time:**
GRADE LEVEL				

Sample Type	Recovery (feet)	Saturation	Field Test S.C. (mS)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				51–59		SANDY SILT (ML) - non-plastic, 15-20% sand, soft, damp, pinkish tan, sandstone seams, odor.
				60–64		SANDY SILT (ML) - similar to above with sandstone seams, strong hydrocarbon odor.
		▽		65–69		SILTY SAND (SM) - poorly graded, fine, loose, moist, tan, with sandstone seams, very strong hydrocarbon odor-saturation @ ~67
				70–79		SILTY SAND (SM) - similar to above, saturated, with sandstone seams.
				80–89		SILTY SAND (SM) - similar to above.
				90–96		SILTY SAND (SM) - similar to above.
				97–99		CLAY (CH) - bed Dokum FM.



WELL 19677 12/12/95

F-204A Austin (8-95)

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WELL CONSTRUCTION LOG

WELL NO. RW-185

Client: FINA OIL AND CHEMICAL COMPANY	Start Date: 10-9-95	End Date: 10-9-95	Page 3 of 3
Site: Big Spring, Texas	Drilling Method: Air/Wet Rotary		Project Number: 50-00195.77
Geologist: James Maly	Driller: Diversified/Powell	Drill Rig Type: Mayhew 1000	Borehole Diameter: 14 Inches
Site Coordinates: N: 241106.8400 E: 791931.8700	Total Depth: 106.00	Surface Elevation (ft.): 2453.24	TOC Elevation (ft.): 2454.18 / PAD Elevation (ft.): 2452.29
Datum Description: GRADE LEVEL	Datum Elevation:	Water Level Depth Below TOC (ft):	Date: / Time:

Sample Type	Recovery (feet)	Saturation	Field Test S.C. (mS)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				101–149		BOREHOLE TERMINATED 100 FEET BELOW GRADE-PRODUCT NOTED IN RETURN PIT

WELL 19677 12/12/95

F-204A Austin (8-95)

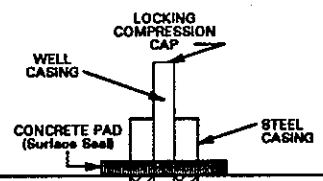
WELL CONSTRUCTION LOG

WELL NO. RW-192

Client: FINA OIL AND CHEMICAL COMPANY		Start Date: 10-18-95	End Date: 10-18-95	Page 1 of 3
Site: Big Spring, Texas		Drilling Method: Air/Wet Rotary		Project Number: 50-00195.77
Geologist: Tracy Payne	Driller: Diversified/Powell	Drill Rig Type: Mayhew 1000		Borehole Diameter: 14 Inches
Site Coordinates: N: 240501.5200 E: 789968.5400	Total Depth: 110.00	Surface Elevation (ft.): 2459.94	TOC Elevation (ft.): 2461.24	PAD Elevation (ft.): 2460.19
Datum Description: GRADE LEVEL	Datum Elevation:	Water Level Depth Below TOC (ft):	Date:	Time:

Sample Type | Recovery (feet) | Saturation | Field Test S.C. (mS) | Depth (feet) | Stratigraphy

LITHOLOGIC DESCRIPTION



Silty Sand (SM) - very fine grained, 30-40% silt, loose, dry, no odor, reddish brown.

Silty Sand (SM) - very fine grained, 20% silt, poorly graded, loose, dry, light tan, no odor, occasional sandstone seams.

Silty Sand (SM) - similar to above.

Sand (SW) - medium to fine grained, well graded, loose, dry, tan, no odor.

Sand (SW) - similar to above.

Sand (SW) - similar to above, increase in silt 20% @ 45' BGL.

16" ID Steel surface casing to 5'

Cement/Bentonite Grout

8"ID Schedule 40 PVC riser

WELL 19577 12/12/95

F-204A Austin (8-95)

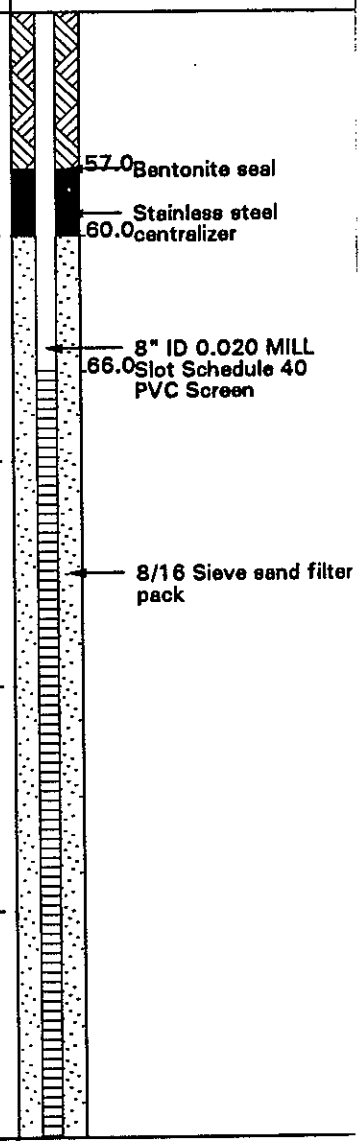
Continued Next Page

WELL CONSTRUCTION LOG

WELL NO. RW-192

Client: FINA OIL AND CHEMICAL COMPANY	Start Date: 10-18-95	End Date: 10-18-95	Page 2 of 3
Site: Big Spring, Texas	Drilling Method: Air/Wet Rotary		Project Number: 50-00195.77
Geologist: Tracy Payne	Driller: Diversified/Powell	Drill Rig Type: Mayhew 1000	Borehole Diameter: 14 Inches
Site Coordinates: N: 240501.5200 E: 789968.5400	Total Depth: 110.00	Surface Elevation (ft.): 2459.94	TOC Elevation (ft.): 2461.24 / PAD Elevation (ft.): 2460.19
Datum Description: GRADE LEVEL	Datum Elevation:	Water Level Depth Below TOC (ft):	Date: / Time:

Sample Type	Recovery (feet)	Saturation	Field Test S.C. (mS)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				51–59		Silty Sand (SM) - very fine grained, 40% silt, poorly graded, loose, dry, no odor, tan.
				60–69		Silty Sand (SM) - similar to above, odor @ 65' BGL, dry, occasional sandstone seams.
		▽		70–79		Silty Sand (SM) - similar to above, odor very strong, with discolored soil, saturation @ 73' BGL.
				80–89		Silty Sand (SM) - similar to above, strong odor, free-phase hydrocarbon in return pit, occasional sandstone seams.
				90–99		Silty Sand (SM) - similar to above, with occasional sandstone seams.



WELL 19577 12/12/95

F-204A Austin (8-95)

Continued Next Page

WELL CONSTRUCTION LOG

WELL NO. RW-192

Client: FINA OIL AND CHEMICAL COMPANY	Start Date: 10-18-95	End Date: 10-18-95	Page 3 of 3
Site: Big Spring, Texas	Drilling Method: Air/Wet Rotary		Project Number: 50-00195.77
Geologist: Tracy Payne	Driller: Diversified/Powell	Drill Rig Type: Mayhew 1000	Borehole Diameter: 14 Inches
Site Coordinates: N: 240501.5200 E: 789968.5400	Total Depth: 110.00	Surface Elevation (ft.): 2459.94	TOC Elevation (ft.): 2461.24 / PAD Elevation (ft.): 2460.19
Datum Description: GRADE LEVEL	Datum Elevation:	Water Level Depth Below TOC (ft):	Date: / Time:

Sample Type	Recovery (feet)	Saturation	Field Test S.C. (mS)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				101–110		Gravelly Sand (SW) - subangular, fine-medium grained, loose, reddish brown, pebble sized gravel, chert, 10% gravel.
				106–110		Clay (CH) - mod-low plasticity, very soft, saturation light reddish brown. Dockum FM
				110		T.D. @ 110' BGL

WELL 19577 12/12/95

F-204A Austin (8-95)

CLASS V TREATED GROUNDWATER REINJECTION WELL LOGS

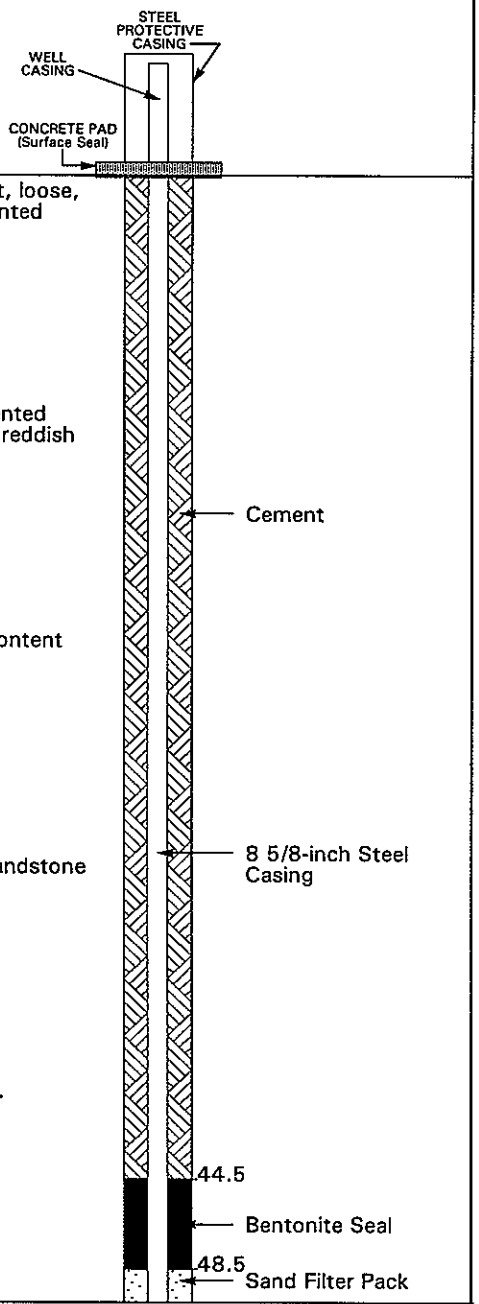
WELL CONSTRUCTION LOG

RMT INC.

WELL NO. RIW-200

Client:		Start Date:	End Date:	Page of
FINA OIL AND CHEMICAL COMPANY		10-15-96	10-31-96	1 3
Site:		Drilling Method:		Project Number:
BIG SPRING, TEXAS		AIR/MUD ROTARY		50-01858.16
Geologist:	Driller:	Drill Rig Type:		Borehole Diameter:
TRACY PAYNE	CHOATE WELL SERVICE	GARDNER-DENVER 1500		12.25 Inches
Site Coordinates, UTM in ft.:	Total Depth (ft-bgl):	Surface Elevation(ft)	TOC Elevation(ft)	PAD Elevation(ft)
N: 240000.2700 E: 793109.5000	120.00	2445.69	2448.24	2446.55
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (feet)	Saturation	OVM (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				1-49		Silty Sand (SM) - Very fine grained with 35-40% silt, loose, dry, reddish tan with poorly cemented nodules.
				10-15		Silty Sand (SM) - Similar to above, moderately cemented zone at 10 feet, color varies from reddish tan to a very light pinkish tan.
				20-30		Silty Sand (SM) - Similar to above, decrease in silt content 20-30%.
				30-31		Silty Sand (SM) - Similar to above, well cemented sandstone at 30 feet(<1 foot thick).
				40-49		Silty Sand (SM) - Similar to above except darker tan.



WELL 01858 1/7/97

F-204A Austin (8-95)

Continued Next Page

WELL CONSTRUCTION LOG

WELL NO. RIW-200

Client: FINA OIL AND CHEMICAL COMPANY		Start Date: 10-15-96	End Date: 10-31-96	Page 2 of 3
Site: BIG SPRING, TEXAS		Drilling Method: AIR/MUD ROTARY		Project Number: 50-01858.16
Geologist: TRACY PAYNE	Driller: CHOATE WELL SERVICE	Drill Rig Type: GARDNER-DENVER 1500		Borehole Diameter: 12.25 Inches
Site Coordinates, UTM in ft.: N: 240000.2700 E: 793109.5000	Total Depth (ft-bgl): 120.00	Surface Elevation(ft) 2445.69	TOC Elevation(ft) 2448.24	PAD Elevation(ft) 2446.55
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (feet)	Saturation	OVM (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				51–99		Silty Sand (SM) - Very fine grained with 20-30% silt, loose, dry, dark tan with poorly cemented nodules.
						Damp at 55 feet.
						Silty Sand (SM) - Similar to above, light brown, increase in moisture content.
		▽				Saturated at 67 feet.
						Silty Sand (SM) - Similar to above, saturated.
						Silty Sand (SM) - Similar to above with occasional sandstone seams, poor to moderately cemented, odor.
						Silty Sand (SM) - Similar to above.
						Sandy Gravel (GW) - 20% sand, coarse grained, subangular gravel- subrounded to subangular, granule to large pebbles, well graded, chert, quartz, limestone, shell fragments, odor.
						Sandy Gravel (GW) - Similar to above except larger pebbles.

8 5/8-inch Steel Casing

57.0

8/16 Sieve Sand Filter Pack

8-inch Stainless Steel 0.02 Slot Vee-Wire Screen

WELL 01858 1/7/97

F-204A Austin (8-95)

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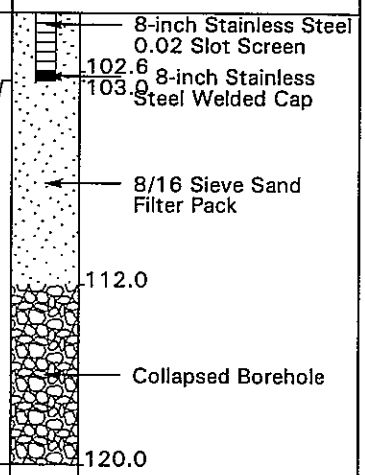
WELL CONSTRUCTION LOG

WELL NO. RIW-200

Client: FINA OIL AND CHEMICAL COMPANY		Start Date: 10-15-96	End Date: 10-31-96	Page 3 of 3
Site: BIG SPRING, TEXAS		Drilling Method: AIR/MUD ROTARY		Project Number: 50-01858.16
Geologist: TRACY PAYNE	Driller: CHOATE WELL SERVICE	Drill Rig Type: GARDNER-DENVER 1500		Borehole Diameter: 12.25 Inches
Site Coordinates, UTM in ft.: N: 240000.2700 E: 793109.5000	Total Depth (ft-bgl): 120.00	Surface Elevation(ft) 2445.69	TOC Elevation(ft) 2448.24	PAD Elevation(ft) 2446.55
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (feet)	Saturation	OVM (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				101–120		Sandy Gravel (GW) - 20% sand, coarse grained, subangular gravel - subrounded to subangular, granule to large pebbles, well graded, chert, quartz, limestone, shell fragments, odor.
				101–120		Clay (CH) - High plasticity, stiff, dry, red, Dockum Formation.
				101–120		Clay (CH) - Similar to above.
				120–149		BORING TERMINATED AT 120 FEET BELOW GRADE



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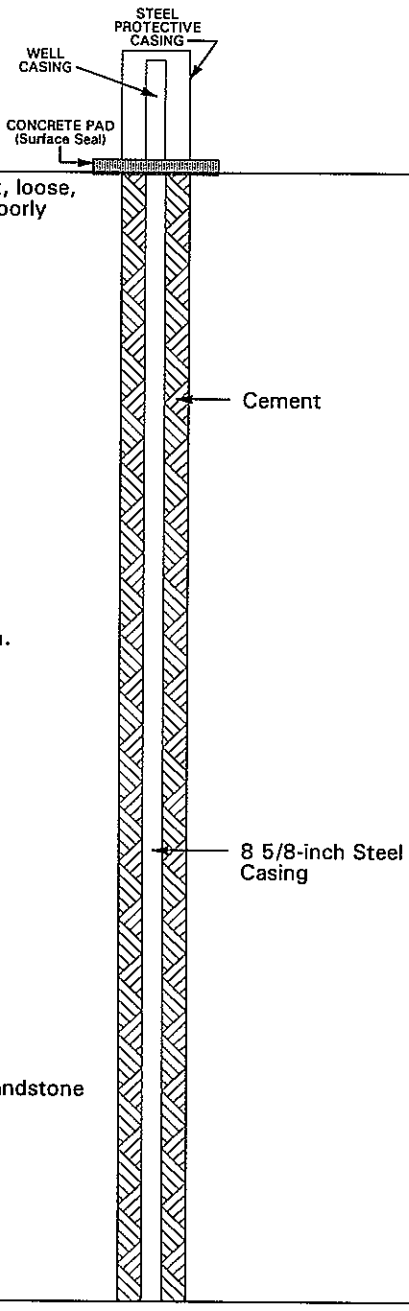
F-204A Austin (8-95)

WELL CONSTRUCTION LOG

WELL NO. RIW-201

Client: FINA OIL AND CHEMICAL COMPANY		Start Date: 10-16-96	End Date: 11-2-96	Page 1 of 3
Site: BIG SPRING, TEXAS		Drilling Method: AIR/MUD ROTARY		Project Number: 50-01858.16
Geologist: TRACY PAYNE	Driller: CHOATE WELL SERVICE	Drill Rig Type: GARDNER-DENVER 1500		Borehole Diameter: 12.25 Inches
Site Coordinates, UTM in ft.: N: 239620.4500 E: 793220.2200	Total Depth (ft-bgl): 120.00	Surface Elevation(ft) 2444.60	TOC Elevation(ft) 2447.24	PAD Elevation(ft) 2445.11
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (feet)	Saturation	OVM (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				1–49		Silty Sand (SM) - Very fine grained with 35-40% silt, loose, dry, reddish tan with occasional poorly cemented sandstone nodules.
						Silty Sand (SM) - Similar to above except tan.
						Silty Sand (SM) - Similar to above except reddish tan.
						Silty Sand (SM) - Similar to above.
						Silty Sand (SM) - Similar to above with occasional sandstone seams.
						Sandstone seam at 45 feet.



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F-204A Austin (8-95)

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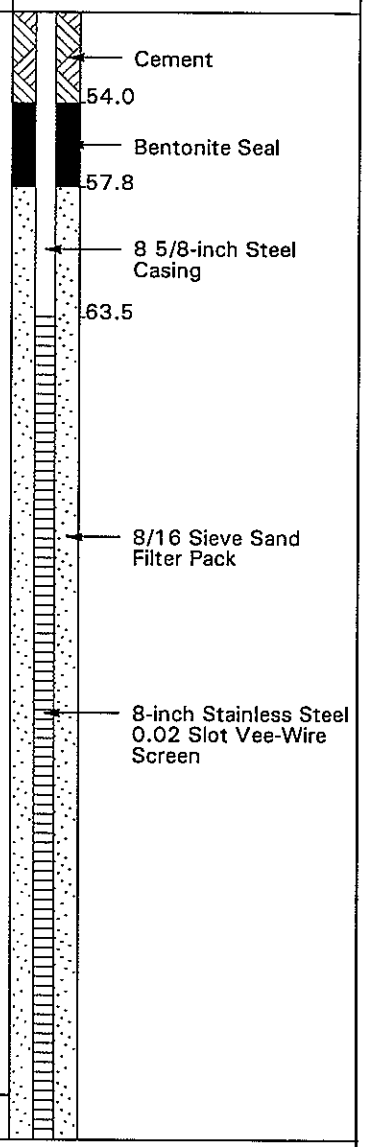
WELL CONSTRUCTION LOG

WELL NO. RIW-201

Client: FINA OIL AND CHEMICAL COMPANY		Start Date: 10-16-96	End Date: 11-2-96	Page 2 of 3
Site: BIG SPRING, TEXAS		Drilling Method: AIR/MUD ROTARY		Project Number: 50-01858.16
Geologist: TRACY PAYNE	Driller: CHOATE WELL SERVICE	Drill Rig Type: GARDNER-DENVER 1500		Borehole Diameter: 12.25 Inches
Site Coordinates, UTM in ft.: N: 239620.4500 E: 793220.2200	Total Depth (ft-bgl): 120.00	Surface Elevation(ft) 2444.60	TOC Elevation(ft) 2447.24	PAD Elevation(ft) 2445.11
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (feet)	Saturation	OVM (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				51-99		Silty Sand (SM) - Very fine grained with 35-40% silt, loose, dry, reddish tan with occasional sandstone seams.
						Silty Sand (SM) - Similar to above except decrease in silt content to about 20%, damp, increase in moisture with depth.
		▽				Saturated at 69 feet; sandstone seam from 69-70 feet.
						Silty Sand (SM) - Similar to above, saturated.
						Silty Sand (SM) - Similar to above with sandstone seams moderately cemented.
						Odor at 87 feet.
						Silty Sand (SM) - Similar to above.
						Sandy Gravel (GW) - 20-30% sand, medium grained, subangular gravel angular- subrounded,



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F-204A Austin (8-95)

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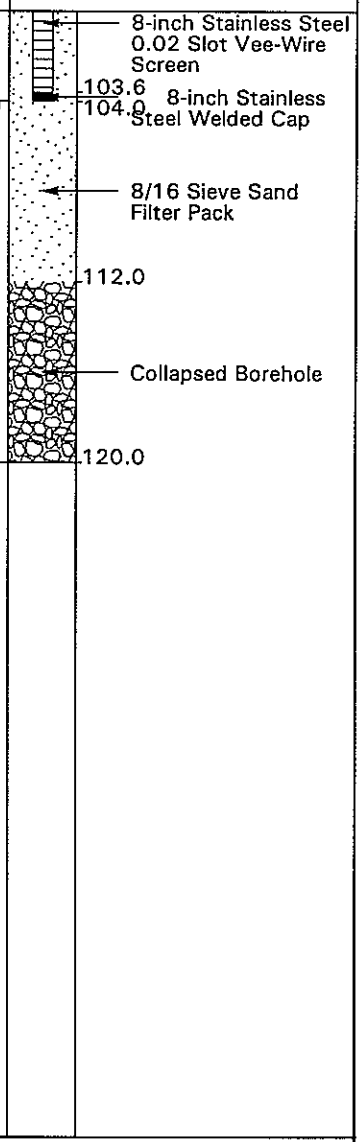
WELL CONSTRUCTION LOG

WELL NO. RIW-201

Client: FINA OIL AND CHEMICAL COMPANY		Start Date: 10-16-96	End Date: 11-2-96	Page 3 of 3
Site: BIG SPRING, TEXAS		Drilling Method: AIR/MUD ROTARY		Project Number: 50-01858.16
Geologist: TRACY PAYNE	Driller: CHOATE WELL SERVICE	Drill Rig Type: GARDNER-DENVER 1500		Borehole Diameter: 12.25 Inches
Site Coordinates, UTM in ft.: N: 239620.4500 E: 793220.2200	Total Depth (ft-bgl): 120.00	Surface Elevation(ft) 2444.60	TOC Elevation(ft) 2447.24	PAD Elevation(ft) 2445.11
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (feet)	Saturation	OVM (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				101–104		granule to pebble well graded, chert, sandstone, limestone, shell fragments, odor.
				104–112		Sandy Gravel (GW) - 20-30% sand, medium grained, subangular gravel angular- subrounded, granule to pebble well graded, chert, sandtone, limestone, shell fragments, odor.
				112–120		Clay (CH) - High plasticity, stiff, dry, red, Dockum Formation.
				120–149		Clay (CH) - Similar to above.
				120		BORING TERMINATED AT 120 FEET BELOW GRADE



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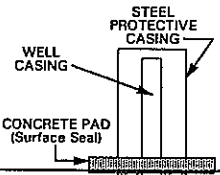
F-204A Austin (8-95)

WELL CONSTRUCTION LOG

WELL NO. RIW-202

Client: FINA OIL AND CHEMICAL COMPANY		Start Date: 10-16-96	End Date: 11-4-96	Page 1 of 3
Site: BIG SPRING, TEXAS		Drilling Method: AIR/MUD ROTARY		Project Number: 50-01858.16
Geologist: TRACY PAYNE	Driller: CHOATE WELL SERVICE	Drill Rig Type: GARDNER-DENVER 1500		Borehole Diameter: 12.25 Inches
Site Coordinates, UTM in ft.: N: 239498.8000 E: 792719.1400	Total Depth (ft-bgl): 100.00	Surface Elevation(ft) 2432.00	TOC Elevation(ft) 2434.77	PAD Elevation(ft) 2432.81
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (feet)	Saturation	OVM (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				1–39		Silty Sand (SM) - Very fine grained, 40% silt, light pinkish tan, dry, compact, with sandstone nodules-well cemented.
						Silty Sand (SM) - Similar to above.
						Sandstone seam at 16 feet, well cemented <1 foot thick, sand less compact below seam.
						Silty Sand (SM) - Similar to above except reddish tan.
						Silty sand (SM) - Similar to above except darker reddish tan.



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F-204A Austin (8-95)

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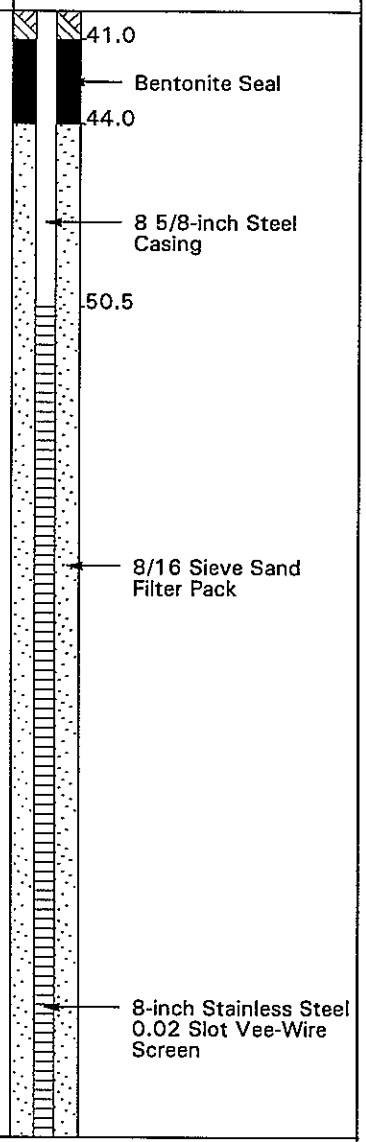
WELL CONSTRUCTION LOG

WELL NO. RIW-202

Client: FINA OIL AND CHEMICAL COMPANY		Start Date: 10-16-96	End Date: 11-4-96	Page 2 of 3
Site: BIG SPRING, TEXAS		Drilling Method: AIR/MUD ROTARY		Project Number: 50-01858.16
Geologist: TRACY PAYNE	Driller: CHOATE WELL SERVICE	Drill Rig Type: GARDNER-DENVER 1500		Borehole Diameter: 12.25 Inches
Site Coordinates, UTM in ft.: N: 239498.8000 E: 792719.1400	Total Depth (ft-bgl): 100.00	Surface Elevation(ft) 2432.00	TOC Elevation(ft) 2434.77	PAD Elevation(ft) 2432.81
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (feet)	Saturation	OVM (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				41–79		Silty Sand (SM) - Very fined grained, silt content decreases to 15-20%, dark reddish tan, compact with sandstone nodules-well cemented, damp at base.
						Silty Sand (SM) - Similar as above.
						Moist at 55 feet.
						Saturation at 57 feet
						Silty Sand (SM) - Similar to above, saturated.
						Silty Sand (SM) - Similar to above, odor at 70 feet.
						Sandstone seam at 72 feet, moderately to well cemented.



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F-204A Austin (8-95)

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WELL CONSTRUCTION LOG

WELL NO. RIW-202

Client: FINA OIL AND CHEMICAL COMPANY	Start Date: 10-16-96	End Date: 11-4-96	Page 3 of 3
Site: BIG SPRING, TEXAS	Drilling Method: AIR/MUD ROTARY		Project Number: 50-01858.16
Geologist: TRACY PAYNE	Driller: CHOATE WELL SERVICE	Drill Rig Type: GARDNER-DENVER 1500	Borehole Diameter: 12.25 Inches
Site Coordinates, UTM in ft.: N: 239498.8000 E: 792719.1400	Total Depth (ft-bgl): 100.00	Surface Elevation(ft): 2432.00 / TOC Elevation(ft): 2434.77	PAD Elevation(ft): 2432.81
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft): / Date:	Time:

Depth (feet)	LITHOLOGIC DESCRIPTION
81–87	Silty Sand (SM) - Very fined grained, silt content decreases to 15-20% dark reddish tan, compact with sandstone nodules-well cemented, saturated.
86–87	Clay (CL) - Low plasticity, soft, saturated, red, "False Red Bed".
87–91	Sandy Gravel (GW) - 40% sand- medium grained, subangular, loose, red; gravel- granule to pebbles, well graded, limestone, chert, quartz, shell fragments, angular to subrounded- saturated.
91–100	Clay (CH) - High plasticity, stiff, dry, red, Dockum Formation.
100	BORING TERMINATED AT 100 FEET BELOW GRADE

8-inch Stainless Steel 0.02 Slot Vee-Wire Screen

8/16 Sieve Sand Filter Pack

90.6

91.0 8-inch Stainless Steel Welded Cap

96.0

Collapsed Borehole

100.0

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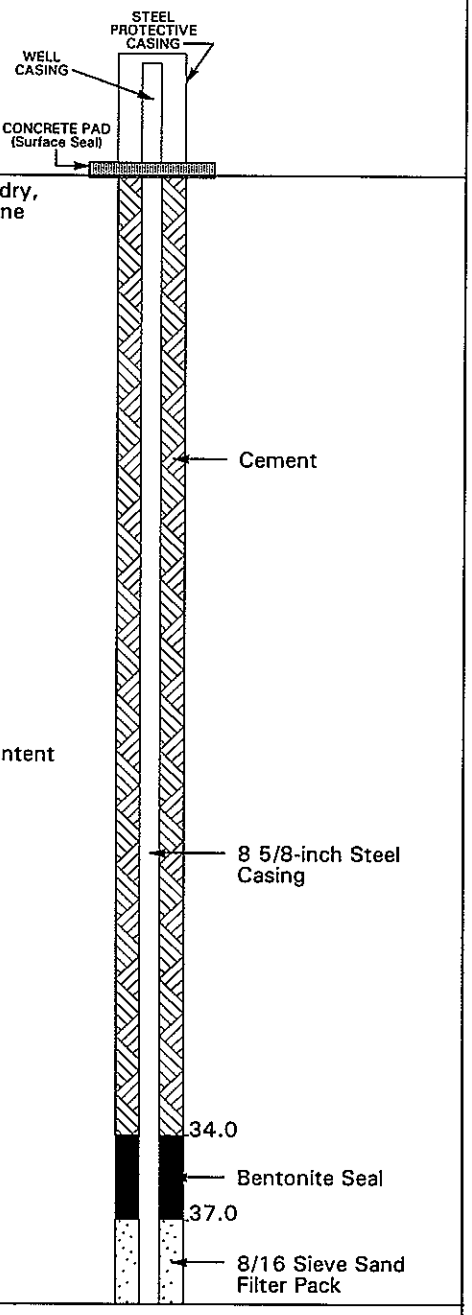
F-204A Austin (8-95)

WELL CONSTRUCTION LOG

WELL NO. RIW-203

Client: FINA OIL AND CHEMICAL COMPANY		Start Date: 10-17-96	End Date: 11-5-96	Page 1 of 3
Site: BIG SPRING, TEXAS		Drilling Method: AIR/MUD ROTARY		Project Number: 50-01858.16
Geologist: TRACY PAYNE	Driller: CHOATE WELL SERVICE	Drill Rig Type: GARDNER-DENVER 1500		Borehole Diameter: 12.25 Inches
Site Coordinates, UTM in ft.: N: 239969.8000 E: 792597.6500	Total Depth (ft-bgl): 100.00	Surface Elevation(ft) 2432.80	TOC Elevation(ft) 2436.06	PAD Elevation(ft) 2433.70
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (feet)	Saturation	OVM (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				1–39		Silty Sand (SM) - Very fine grained, loose, 20% silt, dry, reddish brown, occasional sandstone nodules, poorly cemented.
						Silty Sand (SM) - Similar to above.
						Silty Sand (SM) - Similar to above, decrease in silt content to about 10%
						Silty Sand (SM) - Similar to above.



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F-204A Austin (8-95)

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WELL CONSTRUCTION LOG

WELL NO. RIW-203

Client:		Start Date:	End Date:	Page of
FINA OIL AND CHEMICAL COMPANY		10-17-96	11-5-96	2 3
Site:		Drilling Method:		Project Number:
BIG SPRING, TEXAS		AIR/MUD ROTARY		50-01858.16
Geologist:	Driller:	Drill Rig Type:		Borehole Diameter:
TRACY PAYNE	CHOATE WELL SERVICE	GARDNER-DENVER 1500		12.25 Inches
Site Coordinates, UTM in ft.:	Total Depth (ft-bgl):	Surface Elevation(ft)	TOC Elevation(ft)	PAD Elevation(ft)
N: 239969.8000 E: 792597.6500	100.00	2432.80	2436.06	2433.70
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (feet)	Saturation	OVM (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				41–79		Silty Sand (SM) - Very fined grained, loose, 10% silt, dry, reddish brown, occasional sandstone nodules, poorly cemented.
						Silty Sand (SM) - Similar to above, damp at 50 feet.
						Saturation at 52 feet, odor
						Silty Sand (SM) - Similar to above with occasional sandstone nodules.
						Silty Sand (SM) - Similar to above.
						Sandy Clay (CL) - Low plasticity, very hard, saturated, dark reddish brown.

8 5/8-inch Steel Casing

44.0

8/16 Sieve Sand Filter Pack

8-inch Stainless Steel 0.02 Slot Vee-Wire Screen

WELL 01858 1/7/97

F-204A Austin (8-95)

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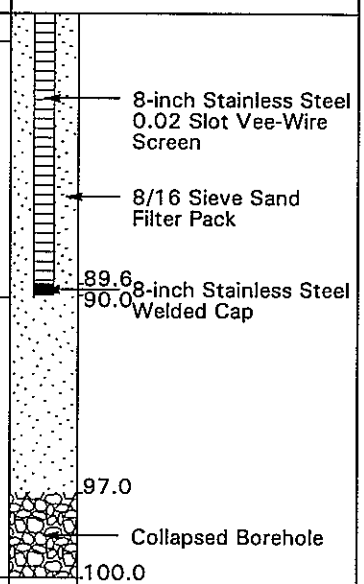
WELL CONSTRUCTION LOG

WELL NO. RIW-203

Client: FINA OIL AND CHEMICAL COMPANY		Start Date: 10-17-96	End Date: 11-5-96	Page 3 of 3
Site: BIG SPRING, TEXAS		Drilling Method: AIR/MUD ROTARY		Project Number: 50-01858.16
Geologist: TRACY PAYNE	Driller: CHOATE WELL SERVICE	Drill Rig Type: GARDNER-DENVER 1500		Borehole Diameter: 12.25 Inches
Site Coordinates, UTM in ft.: N: 239969.8000 E: 792597.6500	Total Depth (ft-bgl): 100.00	Surface Elevation(ft) 2432.80	TOC Elevation(ft) 2436.06	PAD Elevation(ft) 2433.70
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (feet)	Saturation	OVM (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				81–89		Sandy Gravel (GW) - 30-40% medium to coarse grained subangular sand; gravel- subangular to subrounded, granule to large pebbles increasing in size with depth, well graded, chert, shell fragments, limestone, quartz, odor.
				90–100		Clay (CH) - Moderate to high plasticity, stiff, dry, red, Dockum Formation.
				101–119		BORING TERMINATED AT 100 FEET BELOW GRADE



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F-204A Austin (8-95)

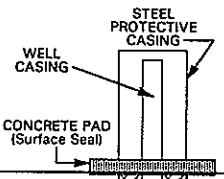
WELL CONSTRUCTION LOG

WELL NO. RIW-204

Client: FINA OIL AND CHEMICAL COMPANY		Start Date: 10-17-96	End Date: 11-6-96	Page 1 of 2
Site: BIG SPRING, TEXAS		Drilling Method: AIR/MUD ROTARY		Project Number: 50-01858.16
Geologist: TRACY PAYNE	Driller: CHOATE WELL SERVICE	Drill Rig Type: GARDNER-DENVER 1500		Borehole Diameter: 12.25 Inches
Site Coordinates, UTM in ft.: N: 239378.6000 E: 792258.2500	Total Depth (ft-bgl): 80.00	Surface Elevation(ft) 2412.30	TOC Elevation(ft) 2415.22	PAD Elevation(ft) 2412.78
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type | Recovery (feet) | Saturation | OVM (ppm) | Depth (feet) | Stratigraphy

LITHOLOGIC DESCRIPTION



Silty Sand (SM) - Very fine grained, 40% silt, loose, damp, brown, with occasional sandstone nodules.

Silty Sand (SM) - Similar to above.
Sandstone seam at 11 feet; < 1 foot thick, tan.

Silty Sand (SM) - Similar to above.

Silty Sand (SM) - Similar to above, odor, occasional sandstone nodules, moderately cemented-gray.

Damp at 35 feet
Saturated at 36 feet

Silty Sand (SM) - Similar to above.

Sandstone seam at 45-46 feet, well cemented, pinkish tan to light brown.

Cement

8 5/8-inch Steel Casing

21.0

Bentonite Seal

24.0

29.5

8-inch Stainless Steel 0.02 Slot Vee-Wire Screen

8/16 Sieve Sand Filter Pack

WELL 01858 1/7/97

F-204A Austin (8-95)

Continued Next Page

WELL CONSTRUCTION LOG

WELL NO. RIW-204

Client: FINA OIL AND CHEMICAL COMPANY	Start Date: 10-17-96	End Date: 11-6-96	Page 2 of 2
Site: BIG SPRING, TEXAS	Drilling Method: AIR/MUD ROTARY		Project Number: 50-01858.16
Geologist: TRACY PAYNE	Driller: CHOATE WELL SERVICE	Drill Rig Type: GARDNER-DENVER 1500	Borehole Diameter: 12.25 Inches
Site Coordinates, UTM in ft.: N: 239378.6000 E: 792258.2500	Total Depth (ft-bgl): 80.00	Surface Elevation(ft) 2412.30	TOC Elevation(ft) 2415.22 / PAD Elevation(ft) 2412.78
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date: / Time:

Sample Type	Recovery (feet)	Saturation	OVM (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				51–65		Silty Sand (SM) - Very fine grained, 40% silt, saturated, pinkish tan to light brown, sandstone seams throughout well cemented.
				65–70		Silty Sand (SM) - Similar to above.
				66–70		Sandy Gravel (GW) - 25% coarse grained, subangular sand with gravel- well graded, granule to large pebbles, subangular to subrounded, shell fragments, chert, quartz, limestone, odor.
				70–80		Clay (CH) - High plasticity, stiff, dry, red, Dockum Formation.
				80–99		BORING TERMINATED AT 80 FEET BELOW GRADE

8/16 Sieve Sand Filter Pack

8-inch Stainless Steel 0.02 Slot Vee-Wire Screen

69.6

70.0 8-inch Stainless Steel Welded Cap

75.0

Collapsed Borehole

80.0

WELL 01858 1/7/97

F-204A Austin (8-95)

WELL CONSTRUCTION LOG

PLUGGED & ABANDONED - replaced with identical well RIW-205R

WELL NO. RIW-205

Client: FINA OIL AND CHEMICAL COMPANY	Start Date: 10-18-96	End Date: 11-7-96	Page 1 of 2
Site: BIG SPRING, TEXAS	Drilling Method: AIR/MUD ROTARY		Project Number: 50-01858.16
Geologist: TRACY PAYNE	Driller: CHOATE WELL SERVICE	Drill Rig Type: GARDNER-DENVER 1500	Borehole Diameter: 12.25 Inches
Site Coordinates, UTM in ft.: N: 239849.9000 E: 792100.8100	Total Depth (ft-bgl): 80.00	Surface Elevation(ft) 2411.10 / TOC Elevation(ft) 2412.05	PAD Elevation(ft) 2411.46
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft): / Date:	Time:

Sample Type | Recovery (feet) | Saturation | OVM (ppm) | Depth (feet) | Stratigraphy

LITHOLOGIC DESCRIPTION

Silty Sand (SM) - Very fine grained, 40% silt, compact, damp, brown.

Silty Sand (SM) - Similar to above, dry.

Tan at 15 feet.

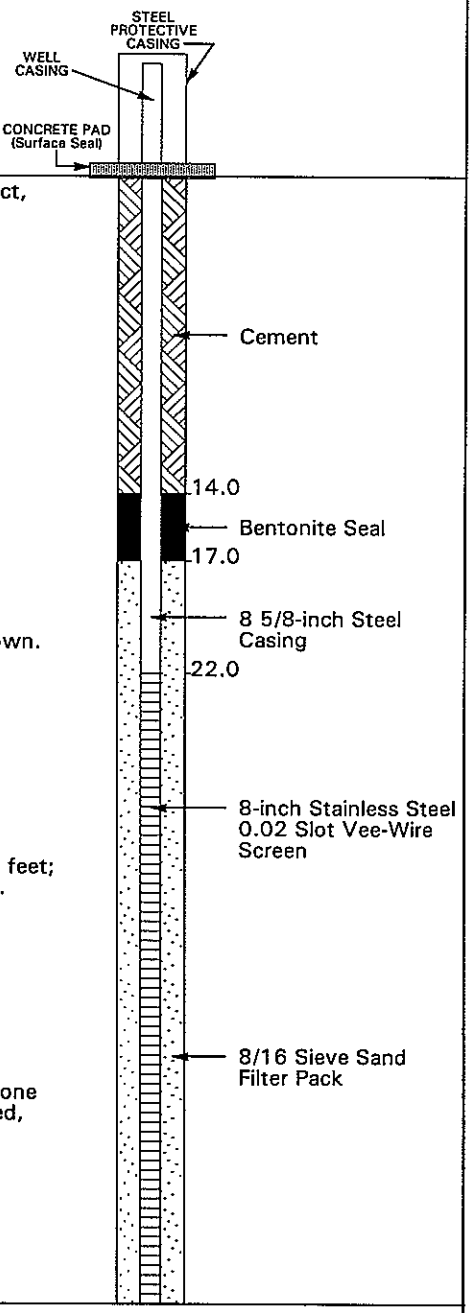
Silty Sand (SM) - Similar to above except reddish brown.

Odor at 26 feet, damp.

Saturation at 29 feet

Silty Sand (SM) - Similar to above, strong odor at 30 feet; odor becomes stronger with depth.

Silty Sand (SM) - Similar to above, occasional sandstone nodules, moderate to well cemented, strong odor.



WELL 01858 1/7/97

F-204A Austin (8-95)

Continued Next Page

WELL CONSTRUCTION LOG

PLUGGED & ABANDONED - replaced with identical well RIW-205R

WELL NO. RIW-205

Client: FINA OIL AND CHEMICAL COMPANY	Start Date: 10-18-96	End Date: 11-7-96	Page 2 of 2
Site: BIG SPRING, TEXAS	Drilling Method: AIR/MUD ROTARY		Project Number: 50-01858.16
Geologist: TRACY PAYNE	Driller: CHOATE WELL SERVICE	Drill Rig Type: GARDNER-DENVER 1500	Borehole Diameter: 12.25 Inches
Site Coordinates, UTM in ft.: N: 239849.9000 E: 792100.8100	Total Depth (ft-bgl): 80.00	Surface Elevation(ft) 2411.10 / TOC Elevation(ft) 2412.05	PAD Elevation(ft) 2411.46
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft): / Date:	Time:

Sample Type | Recovery (feet) | Saturation | OVM (ppm) | Depth (feet) | Stratigraphy

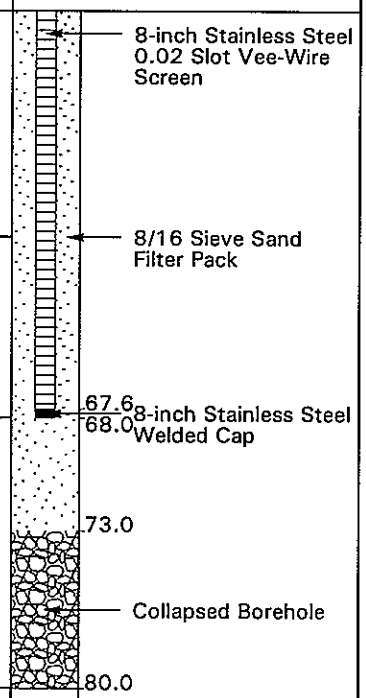
LITHOLOGIC DESCRIPTION

Silty Sand (SM) - Very fine grained, 40% silt, compact, saturated, brown, occasional sandstone nodules, moderate to well cemented, strong odor.

Sandy Gravel (GW) - Medium to coarse grained sand, angular to subangular, gravel- well graded, angular to subrounded, granule to large pebbles, chert, quartz, limestone, shell fragments, saturation, odor.

Clay (CH) - Moderate to high plasticity, firm, dry, red, Dockum Formation.

BORING TERMINATED AT 80 FEET BELOW GRADE



WELL 01858 1/7/97

F-204A Austin (8-95)

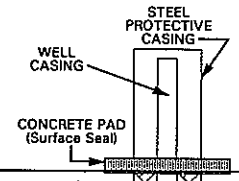
WELL CONSTRUCTION LOG

WELL NO. RIW-206

Client:		Start Date:	End Date:	Page of
FINA OIL AND CHEMICAL COMPANY		10-18-96	10-18-96	1 2
Site:		Drilling Method:		Project Number:
BIG SPRING, TEXAS		AIR/MUD ROTARY		50-01858.16
Geologist:	Driller:	Drill Rig Type:		Borehole Diameter:
TRACY PAYNE	CHOATE WELL SERVICE	GARDNER-DENVER 1500		12.25 Inches
Site Coordinates, UTM in ft.:	Total Depth (ft-bgl):	Surface Elevation(ft)	TOC Elevation(ft)	PAD Elevation(ft)
N: 239770.0300 E: 791600.2100	95.00	2419.10	2421.96	2419.65
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type | Recovery (feet) | Saturation | OVM (ppm) | Depth (feet) | Stratigraphy

LITHOLOGIC DESCRIPTION



Silty Sand (SM) - Very fined grained, 20-30% silt, compact, dry, brown grading to reddish tan.

Silty Sand (SM) - Similar to above.

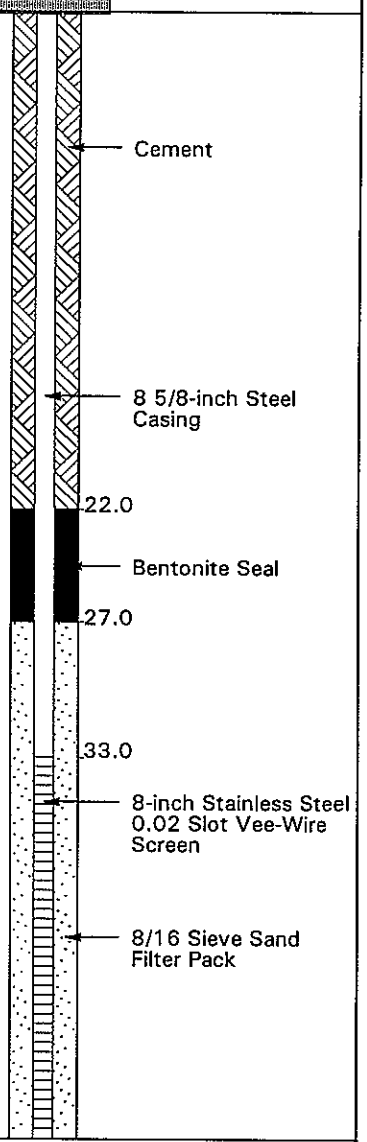
Silty Sand (SM) - Similar to above.

Silty Sand (SM) - Similar to above, damp.

Odor at 32 feet, odor increases with depth.

Saturation at 39 feet, free phase hydrocarbon.

Silty Sand(SM) - Similar to above with sandstone seams throughout, odor, saturated.



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F-204A Austin (8-95)

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WELL CONSTRUCTION LOG

WELL NO. RIW-206

Client: FINA OIL AND CHEMICAL COMPANY		Start Date: 10-18-96	End Date: 10-18-96	Page 2 of 2
Site: BIG SPRING, TEXAS		Drilling Method: AIR/MUD ROTARY		Project Number: 50-01858.16
Geologist: TRACY PAYNE	Driller: CHOATE WELL SERVICE	Drill Rig Type: GARDNER-DENVER 1500		Borehole Diameter: 12.25 Inches
Site Coordinates, UTM in ft.: N: 239770.0300 E: 791600.2100	Total Depth (ft-bgl): 95.00	Surface Elevation(ft) 2419.10	TOC Elevation(ft) 2421.96	PAD Elevation(ft) 2419.65
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (feet)	Saturation	OVM (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				51–73		Silty Sand (SM) - Very fine grained, 20-30% silt, compact, reddish tan, with sandstone seams throughout, odor, saturated.
				60–73		Silty Sand (SM) - Similar to above.
				70–73		Silty Sand (SM) - Similar to above.
				73–75		Clay (CL) - Low plasticity, soft, saturated, red, "False Red Bed".
				76–79		Sandy Gravel (GW) - 30% sand, subangular, fine to medium grained, loose, gravel- angular to subrounded, granule to pebble, quartz, shell fragments, limestone, well graded, larger pebbles at base.
				79–95		Clay (CH) - High plasticity, stiff, dry, dark red, Dockum Formation.
				90–95		Clay (CH) - Similar to above.
				95		BORING TERMINATED AT 95 FEET BELOW GRADE

8/16 Sieve Sand Filter Pack

8-inch Stainless Steel 0.02 Slot Vee-Wire Screen

78.6

79.0 8-inch Stainless Steel Welded Cap

86.0

Collapsed Borehole

95.0

WELL 01858 1/7/97

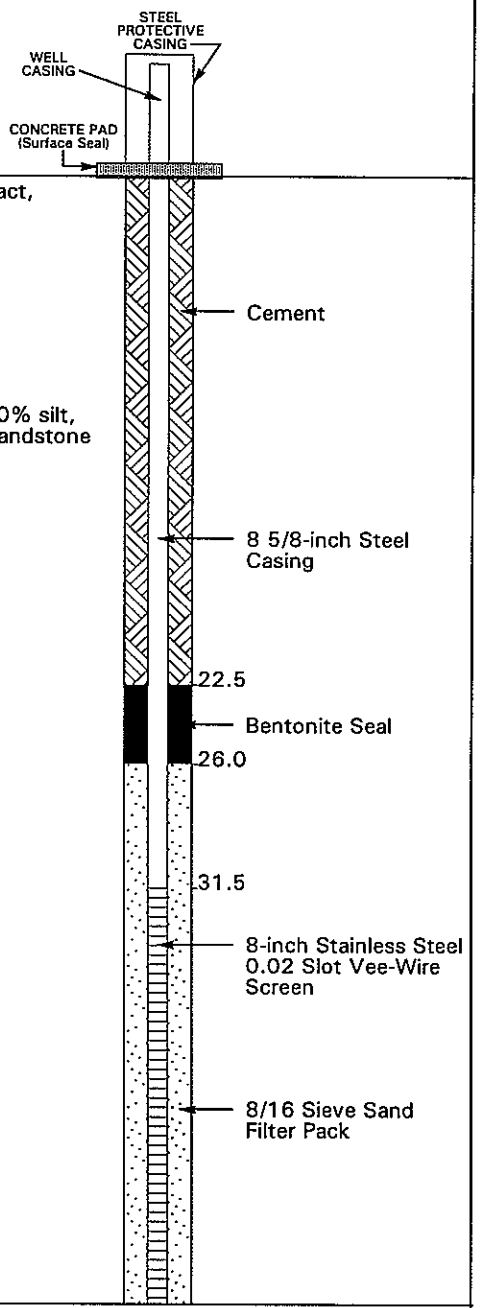
F-204A Austin (8-95)

WELL CONSTRUCTION LOG

WELL NO. RIW-207

Client:		Start Date:	End Date:	Page of
FINA OIL AND CHEMICAL COMPANY		10-21-96	11-11-96	1 2
Site:		Drilling Method:		Project Number:
BIG SPRING, TEXAS		AIR/MUD ROTARY		50-01858.16
Geologist:	Driller:	Drill Rig Type:		Borehole Diameter:
TRACY PAYNE	CHOATE WELL SERVICE	GARDNER-DENVER 1500		12.25 Inches
Site Coordinates, UTM in ft.:	Total Depth (ft-bgl):	Surface Elevation(ft)	TOC Elevation(ft)	PAD Elevation(ft)
N: 239719.5800 E: 791350.1200	80.00	2416.60	2419.57	2416.98
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (feet)	Saturation	OVM (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				1–49		Silty Sand (SM) - Very fine grained, 30% silt, compact, damp, dark brown.
						Silty Sand (SM) - Similar to above, poorly graded, 20% silt, dry, reddish tan with occasional sandstone nodules.
						Silty Sand (SM) - Similar to above.
						Silty Sand (SM) - Similar to above, damp. Odor at 31 feet.
						Very strong odor at 35 feet.
						Saturated at 39 feet Silty Sand (SM) - Similar to above.



WELL 01858 1/7/97

F-204A Austin (8-95)

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WELL CONSTRUCTION LOG

WELL NO. RIW-207

Client: FINA OIL AND CHEMICAL COMPANY	Start Date: 10-21-96	End Date: 11-11-96	Page 2 of 2
Site: BIG SPRING, TEXAS	Drilling Method: AIR/MUD ROTARY		Project Number: 50-01858.16
Geologist: TRACY PAYNE	Driller: CHOATE WELL SERVICE	Drill Rig Type: GARDNER-DENVER 1500	Borehole Diameter: 12.25 Inches
Site Coordinates, UTM in ft.: N: 239719.5800 E: 791350.1200	Total Depth (ft-bgl): 80.00	Surface Elevation(ft) 2416.60	TOC Elevation(ft) 2419.57 / PAD Elevation(ft) 2416.98
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date: / Time:

Sample Type | Recovery (feet) | Saturation | OVM (ppm) | Depth (feet) | Stratigraphy

LITHOLOGIC DESCRIPTION

Silty Sand (SM) - Poorly graded sand, 20% silt, saturated, reddish tan with occasional sandstone nodules.
Sandstone seam at 52 feet

Strong odor at 55 feet.

Sandy Clay (CL) - 40% sand, low plasticity, very stiff, saturated, red, "False Red Bed".

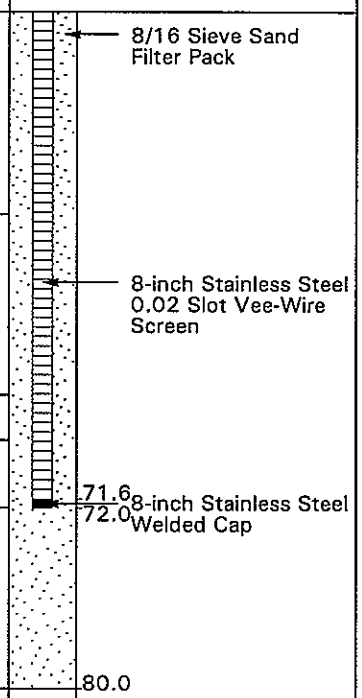
Sandy Clay (CL) - 20% sand, moderate to high plasticity, soft to very soft, red, saturated.

Sand (SP) - Fine grained, angular, loose, saturated, reddish tan, odor.

Sandy Gravel (GW) - 40% angular fine grained sand; gravel-well graded, subangular to subrounded, granule to pebble, saturated, chert, quartz, limestone, shell fragments, odor.

Clay (CH) - High plasticity, stiff, dry, red, Dockum Formation.

BORING TERMINATED AT 80 FEET BELOW GRADE



WELL 01858 1/7/97

F-204A Austin (8-95)

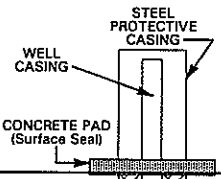
WELL CONSTRUCTION LOG

WELL NO. RIW-208

Client:		Start Date:	End Date:	Page of
FINA OIL AND CHEMICAL COMPANY		10-21-96	11-12-96	1 2
Site:		Drilling Method:		Project Number:
BIG SPRING, TEXAS		AIR/MUD ROTARY		50-01858.16
Geologist:	Driller:	Drill Rig Type:		Borehole Diameter:
TRACY PAYNE	CHOATE WELL SERVICE	GARDNER-DENVER 1500		12.25 Inches
Site Coordinates, UTM in ft.:	Total Depth (ft-bgl):	Surface Elevation(ft)	TOC Elevation(ft)	PAD Elevation(ft)
N: 239674.9900 E: 791103.5200	80.00	2412.50	2415.74	2413.17
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type | Recovery (feet) | Saturation | OVM (ppm) | Depth (feet) | Stratigraphy

LITHOLOGIC DESCRIPTION



Silty Sand (SM) - Very fine grained; 30-40% silt, loose, dry, pinkish tan.

Silty Sand (SM) - Similar to above.

Silty Sand (SM) - Similar to above, reddish tan.

Silty Sand(SM) - Similar to above except damp to moist.

Saturated at 33 feet

Strong odor at 35 feet

Silty Sand (SM) - Similar to above.

Cement

14.5

Bentonite Seal

18.0

8 5/8-inch Steel Casing

23.0

8-inch Stainless Steel 0.02 Slot Vee-Wire Screen

8/16 Sieve Sand Filter Pack

WELL 01858 1/7/97

F-204A Austin (8-95)

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WELL CONSTRUCTION LOG

WELL NO. RIW-208

Client: FINA OIL AND CHEMICAL COMPANY		Start Date: 10-21-96 / End Date: 11-12-96	Page 2 of 2
Site: BIG SPRING, TEXAS		Drilling Method: AIR/MUD ROTARY	Project Number: 50-01858.16
Geologist: TRACY PAYNE	Driller: CHOATE WELL SERVICE	Drill Rig Type: GARDNER-DENVER 1500	Borehole Diameter: 12.25 Inches
Site Coordinates, UTM in ft.: N: 239674.9900 E: 791103.5200	Total Depth (ft-bgl): 80.00	Surface Elevation(ft): 2412.50 / TOC Elevation(ft): 2415.74	PAD Elevation(ft): 2413.17
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft): / Date:	Time:

Depth (feet)	LITHOLOGIC DESCRIPTION
51–52	Silty Sand (SM) - Very fine grained, 30-40% silt, loose, saturated, reddish tan.
53–55	Sandy Clay (CL) - 30-40% sand, very stiff to firm, red, saturated, low plasticity, "False Red Bed".
56–60	Sandy Clay (CL) - 20% sand, moderate plasticity, soft to very soft, red, saturated.
61–64	Sandy Clay (CL) - Similar to above with gypsum flakes at base.
65–68	Sandy Gravel (GW) - 40% medium grained, subangular sand; Gravel- granule to pebble, well graded, loose, saturated, subangular to subrounded, quartz, limestone, shell fragments.
69–79	Clay (CH) - Stiff, high plasticity, dry, red, Dockum Formation.
80	BORING TERMINATED AT 80 FEET BELOW GRADE

8/16 Sieve Sand Filter Pack

8-inch Stainless Steel 0.02 Slot Vee-Wire Screen

68.6

69.0 8-inch Stainless Steel Welded Cap

75.0

Collapsed Borehole

80.0

WELL 01858 1/7/97

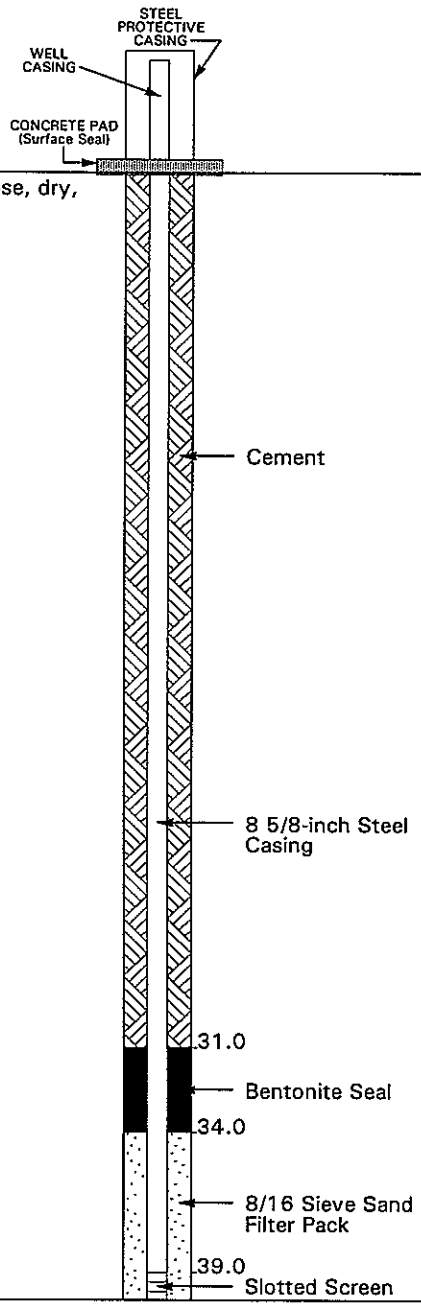
F-204A Austin (8-95)

WELL CONSTRUCTION LOG

WELL NO. RIW-209

Client: FINA OIL AND CHEMICAL COMPANY		Start Date: 10-21-96	End Date: 11-13-96	Page 1 of 3
Site: BIG SPRING, TEXAS		Drilling Method: AIR/MUD ROTARY		Project Number: 50-01858.16
Geologist: TRACY PAYNE	Driller: CHOATE WELL SERVICE	Drill Rig Type: GARDNER-DENVER 1500		Borehole Diameter: 12.25 Inches
Site Coordinates, UTM in ft.: N: 239550.1600 E: 790603.7700	Total Depth (ft-bgl): 100.00	Surface Elevation(ft) 2425.30	TOC Elevation(ft) 2428.66	PAD Elevation(ft) 2426.48
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (feet)	Saturation	OVM (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				1–39		Silty Sand (SM) - 20-30% silt, very fine grained, loose, dry, pinkish tan.
				10		Silty Sand (SM) - Similar to above.
				20		Silty Sand (SM) - Similar to above, light reddish tan.
				30		Silty Sand (SM) - Similar to above, 10-20% silt.
				38		Faint odor at 38 feet.



WELL 01858 1/7/97

F-204A Austin (8-95)

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WELL CONSTRUCTION LOG

WELL NO. RIW-209

Client: FINA OIL AND CHEMICAL COMPANY		Start Date: 10-21-96	End Date: 11-13-96	Page 2 of 3
Site: BIG SPRING, TEXAS		Drilling Method: AIR/MUD ROTARY		Project Number: 50-01858.16
Geologist: TRACY PAYNE	Driller: CHOATE WELL SERVICE	Drill Rig Type: GARDNER-DENVER 1500		Borehole Diameter: 12.25 Inches
Site Coordinates, UTM in ft.: N: 239550.1600 E: 790603.7700	Total Depth (ft-bgl): 100.00	Surface Elevation(ft) 2425.30	TOC Elevation(ft) 2428.66	PAD Elevation(ft) 2426.48
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (feet)	Saturation	OVM (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				41–79		Silty Sand (SM) - Very fine grained, 10-20% silt, loose, dry, light reddish tan.
						Damp at 45 feet.
		▽				Saturated at 48 feet
						Silty Sand (SM) - Similar to above.
						Silty Sand (SM) - Similar to above.
						Sandy Clay (CL) - 30-40% sand, very stiff, low plasticity, saturated, red, "False Red Bed".
						Sandy Clay (CL) - 20% sand, moderate plasticity, soft, saturated, red, "False Red Bed".
						Sandy Gravel (GW) - 20% medium, subangular sand; Gravel-

8/16 Sieve Sand Filter Pack

8-inch Stainless Steel 0.02 Slot Vee-Wire Screen

WELL 01858 1/7/97

F-204A Austin (8-95)

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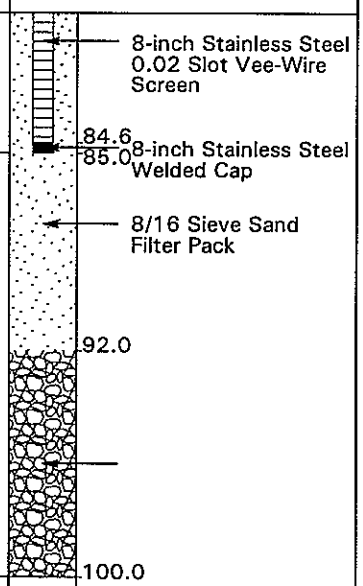
WELL CONSTRUCTION LOG

WELL NO. RIW-209

Client: FINA OIL AND CHEMICAL COMPANY		Start Date: 10-21-96	End Date: 11-13-96	Page 3 of 3
Site: BIG SPRING, TEXAS		Drilling Method: AIR/MUD ROTARY		Project Number: 50-01858.16
Geologist: TRACY PAYNE	Driller: CHOATE WELL SERVICE	Drill Rig Type: GARDNER-DENVER 1500		Borehole Diameter: 12.25 Inches
Site Coordinates, UTM in ft.: N: 239550.1600 E: 790603.7700	Total Depth (ft-bgl): 100.00	Surface Elevation(ft) 2425.30	TOC Elevation(ft) 2428.66	PAD Elevation(ft) 2426.48
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (feet)	Saturation	OVM (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				81–84		granule to large pebbles, well graded, loose, saturated, subangular to subrounded, quartz, shell fragments, limestone, <10% cobbles.
				85–100		Clay (CH) - High plasticity, stiff, dry, red, Dockum Formation.
				101–119		BORING TERMINATED AT 100 FEET BELOW GRADE



WELL 01858 1/7/97

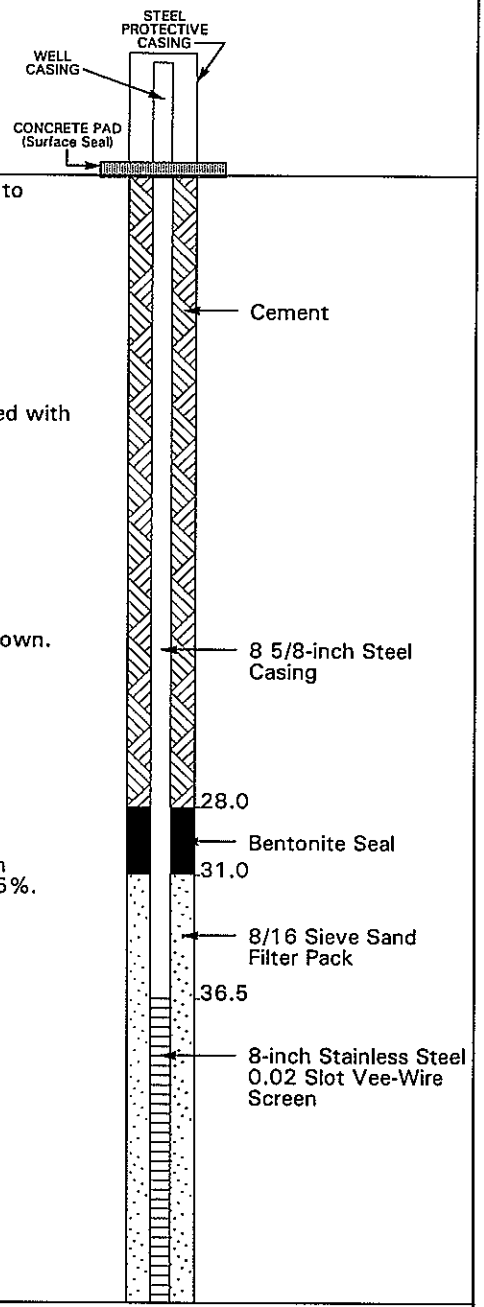
F-204A Austin (8-95)

WELL CONSTRUCTION LOG

WELL NO. RIW-210

Client: FINA OIL AND CHEMICAL COMPANY		Start Date: 10-22-96	End Date: 10-29-96	Page 1 of 2
Site: BIG SPRING, TEXAS		Drilling Method: AIR/MUD ROTARY		Project Number: 50-01858.16
Geologist: TRACY PAYNE	Driller: CHOATE WELL SERVICE	Drill Rig Type: GARDNER-DENVER 1500		Borehole Diameter: 12.25 Inches
Site Coordinates, UTM in ft.: N: 239200.2800 E: 790997.9600	Total Depth (ft-bgl): 90.00	Surface Elevation(ft) 2420.50	TOC Elevation(ft) 2422.86	PAD Elevation(ft) 2421.01
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (feet)	Saturation	OVM (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				1–49		Silty Sand (SM) - Very fine grained, 40% silt, loose to compact, dry, pinkish tan.
						Silty Sand (SM) - Similar to above except fine grained with 20% silt.
						Silty Sand (SM) - Similar to above except reddish brown.
						Silty Sand (SM) - Similar to above except damp with occasional sandstone nodules < 5%.
		▽				Silty Sand (SM) - Similar to above, except moist.
						Saturated at 44 feet



WELL 01858 1/7/97

F-204A Austin (8-95)

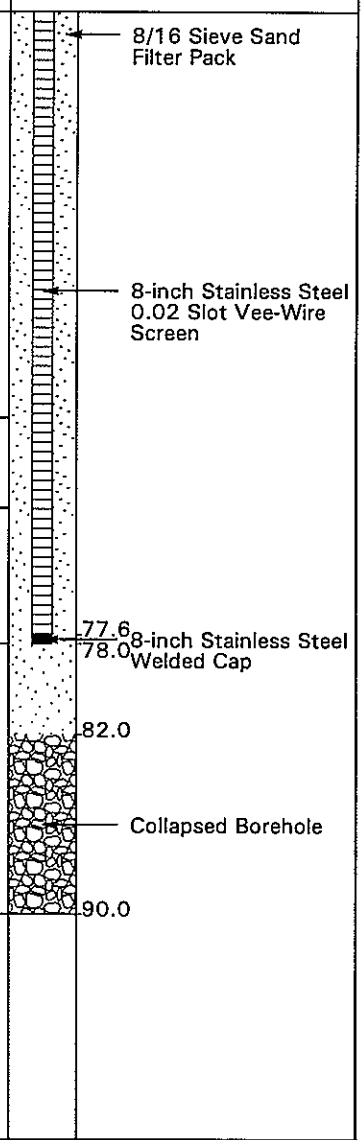
Continued Next Page

WELL CONSTRUCTION LOG

WELL NO. RIW-210

Client: FINA OIL AND CHEMICAL COMPANY	Start Date: 10-22-96	End Date: 10-29-96	Page 2 of 2
Site: BIG SPRING, TEXAS	Drilling Method: AIR/MUD ROTARY		Project Number: 50-01858.16
Geologist: TRACY PAYNE	Driller: CHOATE WELL SERVICE	Drill Rig Type: GARDNER-DENVER 1500	Borehole Diameter: 12.25 Inches
Site Coordinates, UTM in ft.: N: 239200.2800 E: 790997.9600	Total Depth (ft-bgl): 90.00	Surface Elevation(ft) 2420.50 / TOC Elevation(ft) 2422.86	PAD Elevation(ft) 2421.01
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft): / Date:	Time:

Sample Type	Recovery (feet)	Saturation	OVM (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				51–68		Silty Sand(SM) - Very fine grained, 20% silt, loose to compact, saturated, reddish brown. Sandstone seam at 59 feet. Silty Sand (SM) - Similar to above, sandstone seam at 60 feet.
				68–72		Sandy Clay (CL) - Low plasticity, 10-20% sand, soft, saturated, red, "False Red Bed".
				72–78		Sandy Gravel (GW) - 20% fine to medium grained subangular sand; gravel- granule to pebble sized, well graded, angular to subrounded, saturated, limestone, sandstone, quartz, shell fragments.
				78–90		Clay (CH) - High plasticity, stiff, dry, red, Dockum Formation.
				90		BORING TERMINATED AT 90 FEET BELOW GRADE



WELL 01858 1/7/97

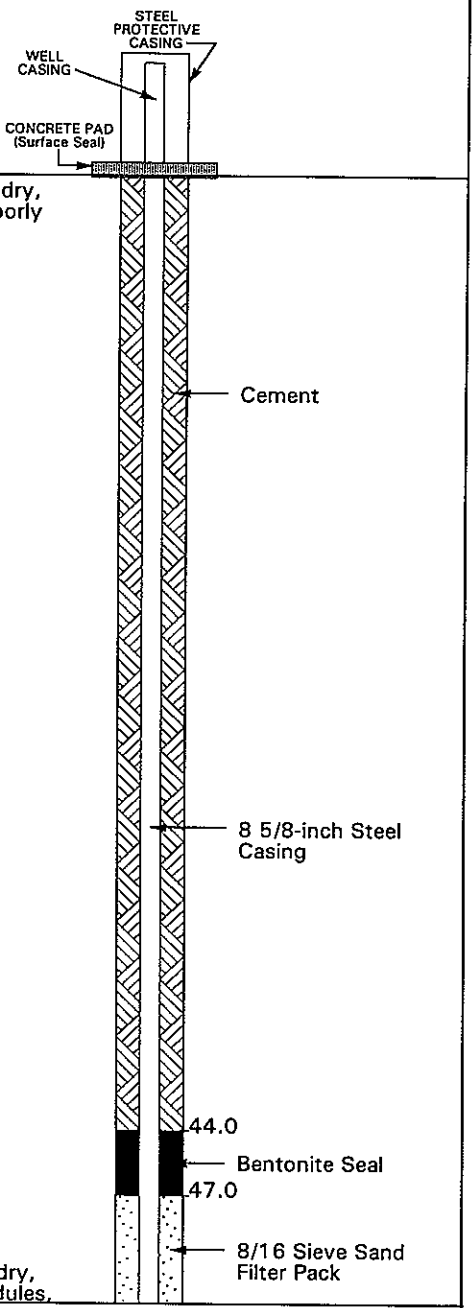
F-204A Austin (8-95)

WELL CONSTRUCTION LOG

WELL NO. RIW-211

Client: FINA OIL AND CHEMICAL COMPANY		Start Date: 10-22-96	End Date: 10-28-96	Page 1 of 3
Site: BIG SPRING, TEXAS		Drilling Method: AIR/MUD ROTARY		Project Number: 50-01858.16
Geologist: TRACY PAYNE	Driller: CHOATE WELL SERVICE	Drill Rig Type: GARDNER-DENVER 1500		Borehole Diameter: 12.25 Inches
Site Coordinates, UTM in ft.: N: 239051.0200 E: 790541.0200	Total Depth (ft-bgl): 120.00	Surface Elevation(ft) 2445.50	TOC Elevation(ft) 2448.11	PAD Elevation(ft) 2446.08
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (feet)	Saturation	OVM (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				1–51		Silty Sand (SM) - Very fine grained, 40% silt, loose, dry, pinkish tan, sandstone nodules, poorly cemented.
						Silty Sand (SM) - Similar to above.
						Silty Sand (SM) - Similar to above.
						Light reddish tan at 25 feet, silt 20%.
						Silty Sand (SM) - Similar to above.
						Silty Sand (SM) - Similar to above.
						Light reddish brown at 45 feet.
						Silty Sand (SM) - Very fine grained, 20% silt, loose, dry, light reddish brown, sandstone nodules,



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F-204A Austin (8-95)

Continued Next Page

WELL CONSTRUCTION LOG

WELL NO. RIW-211

Client: FINA OIL AND CHEMICAL COMPANY		Start Date: 10-22-96	End Date: 10-28-96	Page 2 of 3
Site: BIG SPRING, TEXAS		Drilling Method: AIR/MUD ROTARY		Project Number: 50-01858.16
Geologist: TRACY PAYNE	Driller: CHOATE WELL SERVICE	Drill Rig Type: GARDNER-DENVER 1500		Borehole Diameter: 12.25 Inches
Site Coordinates, UTM in ft.: N: 239051.0200 E: 790541.0200	Total Depth (ft-bgl): 120.00	Surface Elevation(ft) 2445.50	TOC Elevation(ft) 2448.11	PAD Elevation(ft) 2446.08
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type | Recovery (feet) | Saturation | OVM (ppm) | Depth (feet) | Stratigraphy

LITHOLOGIC DESCRIPTION

poorly cemented.

Damp at 55 feet

Silty Sand (SM) - Similar to above, except fine grained, damp, reddish brown.

Saturation at 69 feet.

Silty Sand (SM) - Similar to above.

Silty Sand (SM) - Similar to above.

Silty Sand (SM) - Similar to above.

Sandy Clay (CL) - 20% very fine sand, low plasticity, soft, saturated, red, "False Red Bed".

Sandy Gravel (GW) - 20% medium grained, angular sand; Gravel- angular to subrounded, well graded, granule to pebble, shell fragments, quartz, sandstone, limestone, chert, saturated.

Clay (CH) - Stiff, high plasticity, dry, red, Dockum Formation.

8 5/8-inch Steel Casing

59.0

8/16 Sieve Sand Filter Pack

8-inch Stainless Steel 0.02 Slot Vee-Wire Screen

99.6

100.0 8-inch Stainless Steel Welded Cap

WELL 01858 1/7/97

F-204A Austin (8-95)

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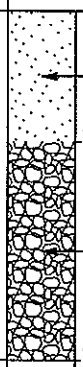
WELL CONSTRUCTION LOG

WELL NO. RIW-211

Client:		Start Date:	End Date:	Page of
FINA OIL AND CHEMICAL COMPANY		10-22-96	10-28-96	3 3
Site:		Drilling Method:		Project Number:
BIG SPRING, TEXAS		AIR/MUD ROTARY		50-01858.16
Geologist:	Driller:	Drill Rig Type:		Borehole Diameter:
TRACY PAYNE	CHOATE WELL SERVICE	GARDNER-DENVER 1500		12.25 Inches
Site Coordinates, UTM in ft.:	Total Depth (ft-bgl):	Surface Elevation(ft)	TOC Elevation(ft)	PAD Elevation(ft)
N: 239051.0200 E: 790541.0200	120.00	2445.50	2448.11	2446.08
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (feet)	Saturation	OVM (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				105–120		CLAY (CH) - Similar to above.
				120		BORING TERMINATED AT 120 FEET BELOW GRADE



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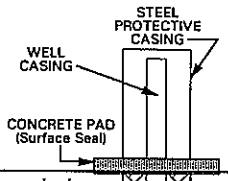
F-204A Austin (8-95)

WELL CONSTRUCTION LOG

WELL NO. RIW-212

Client:		Start Date:	End Date:	Page of
FINA OIL AND CHEMICAL COMPANY		10-22-96	10-22-96	1 3
Site:		Drilling Method:		Project Number:
BIG SPRING, TEXAS		AIR/MUD ROTARY		50-01858.16
Geologist:	Driller:	Drill Rig Type:		Borehole Diameter:
TRACY PAYNE	CHOATE WELL SERVICE	GARDNER-DENVER 1500		12.25 Inches
Site Coordinates, UTM in ft.:	Total Depth (ft-bgl):	Surface Elevation(ft)	TOC Elevation(ft)	PAD Elevation(ft)
N: 239440.8800 E: 790109.8500	120.00	2450.90	2453.89	2451.44
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (feet)	Saturation	OVM (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				1–5		Silty Sand (SM) - Fine grained, 40% silt, compact, dry, dark brown.
				6–9		Silty Sand (SM) - Very fine grained, 40% silt, dense, dry, pinkish tan, occasional moderately cemented sandstone seams.
				10–20		Silty Sand (SM) - Similar to above.
				21–30		Silty Sand (SM) - Similar to above, except reddish tan.
				31–40		Silty Sand (SM) - Similar to above.
				41–49		Silty Sand (SM) - Similar to above.



WELL 01858 1/7/97

F-204A Austin (8-95)

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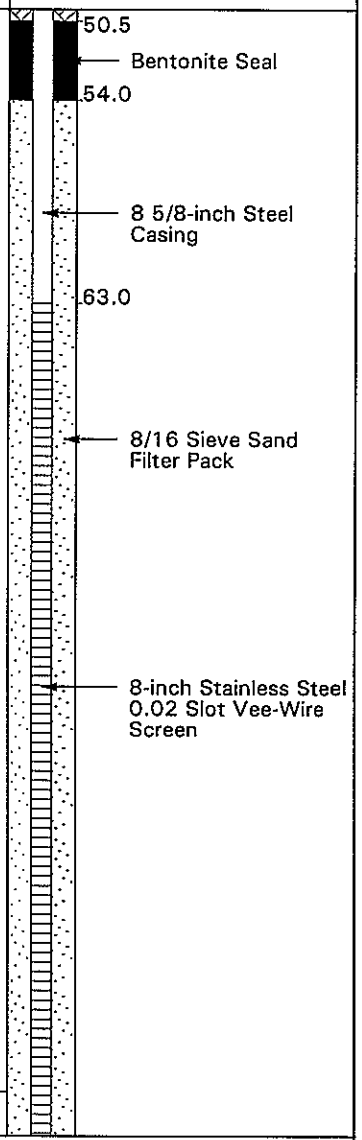
WELL CONSTRUCTION LOG

WELL NO. RIW-212

Client: FINA OIL AND CHEMICAL COMPANY	Start Date: 10-22-96	End Date: 10-22-96	Page 2 of 3
Site: BIG SPRING, TEXAS	Drilling Method: AIR/MUD ROTARY		Project Number: 50-01858.16
Geologist: TRACY PAYNE	Driller: CHOATE WELL SERVICE	Drill Rig Type: GARDNER-DENVER 1500	Borehole Diameter: 12.25 Inches
Site Coordinates, UTM in ft.: N: 239440.8800 E: 790109.8500	Total Depth (ft-bgl): 120.00	Surface Elevation(ft) 2450.90	TOC Elevation(ft) 2453.89 / PAD Elevation(ft) 2451.44
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date: / Time:

Sample Type	Recovery (feet)	Saturation	OVM (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				51–99		Silty Sand (SM) - Very fine grained, 40 % silt, dense, reddish tan, occasional moderately cemented sandstone seams.
						Damp at 55 feet.
						Silty Sand(SM) - Similar to above, except reddish brown, damp.
		▽				Silty Sand (SM) - Similar to above.
						Saturated at 72 feet, strong odor.
						Silty Sand (SM) - Similar to above with strong odor.
						Silty Sand (SM) - Similar to above.
						Sandy Clay (CL) - Low plasticity, very soft, saturated, red.



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F-204A Austin (8-95)

Continued Next Page

WELL CONSTRUCTION LOG

WELL NO. RIW-212

Client: FINA OIL AND CHEMICAL COMPANY		Start Date: 10-22-96	End Date: 10-22-96	Page 3 of 3
Site: BIG SPRING, TEXAS		Drilling Method: AIR/MUD ROTARY		Project Number: 50-01858.16
Geologist: TRACY PAYNE	Driller: CHOATE WELL SERVICE	Drill Rig Type: GARDNER-DENVER 1500		Borehole Diameter: 12.25 Inches
Site Coordinates, UTM in ft.: N: 239440.8800 E: 790109.8500	Total Depth (ft-bgl): 120.00	Surface Elevation(ft) 2450.90	TOC Elevation(ft) 2453.89	PAD Elevation(ft) 2451.44
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (feet)	Saturation	OVM (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				1–3		Sandy Clay(CL) - Low plasticity, very soft, saturated, red.
				4–8		Gravel (GW) - Angular, very dense, well graded, granule to pebble, sandstone, limestone, quartz, saturated.
				9–20		Clay (CH) - High plasticity, stiff, dry, red, Dockum Formation.
				21		BORING TERMINATED AT 120 FEET BELOW GRADE

8-inch Stainless Steel 0.02 Slot Vee-Wire Screen

107.6

108.0 8-inch Stainless Steel Welded Cap

8/16 Sieve Sand Filter Pack

116.0

Collapsed Borehole

120.0

WELL 01858 1/7/97

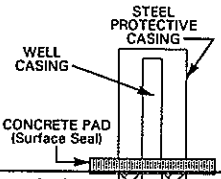
F-204A Austin (8-95)

WELL CONSTRUCTION LOG

WELL NO. RIW-213

Client: FINA OIL AND CHEMICAL COMPANY		Start Date: 10-23-96	End Date: 10-24-96	Page 1 of 3
Site: BIG SPRING, TEXAS		Drilling Method: AIR/MUD ROTARY		Project Number: 50-01858.16
Geologist: TRACY PAYNE	Driller: CHOATE WELL SERVICE	Drill Rig Type: GARDNER-DENVER 1500		Borehole Diameter: 12.25 Inches
Site Coordinates, UTM in ft.: N: 239301.7500 E: 789629.8800	Total Depth (ft-bgl): 120.00	Surface Elevation(ft) 2453.30	TOC Elevation(ft) 2456.26	PAD Elevation(ft) 2453.76
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (feet)	Saturation	OVM (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				1–3		Silty Sand (SM) - Fine grained, 40% silt, compact, dry, dark brown.
				4–9		Silty Sand (SM) - Very fine grained, 40% silt, dense to very dense, dry, pinkish tan, occasional moderately - well cemented sandstone seams.
				10–14		Silty Sand (SM) - Similar to above.
				15–20		Silty Sand (SM) - Similar to above.
				21–30		Silty Sand SM) - Similar to above except reddish tan.
				31–49		Silty Sand (SM) - Similar to above except darker reddish tan.



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F-204A Austin (8-95)

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WELL CONSTRUCTION LOG

WELL NO. RIW-213

Client:		Start Date:	End Date:	Page of
FINA OIL AND CHEMICAL COMPANY		10-23-96	10-24-96	2 3
Site:		Drilling Method:		Project Number:
BIG SPRING, TEXAS		AIR/MUD ROTARY		50-01858.16
Geologist:	Driller:	Drill Rig Type:		Borehole Diameter:
TRACY PAYNE	CHOATE WELL SERVICE	GARDNER-DENVER 1500		12.25 Inches
Site Coordinates, UTM in ft.:	Total Depth (ft-bgl):	Surface Elevation(ft)	TOC Elevation(ft)	PAD Elevation(ft)
N: 239301.7500 E: 789629.8800	120.00	2453.30	2456.26	2453.76
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type | Recovery (feet) | Saturation | OVM (ppm) | Depth (feet) | Stratigraphy

LITHOLOGIC DESCRIPTION

Silty Sand (SM) - Very fine grained, 40% silt, dense to very dense, dry, dark reddish tan, occasional moderately-well cemented sandstone seams.

Damp at 55 feet

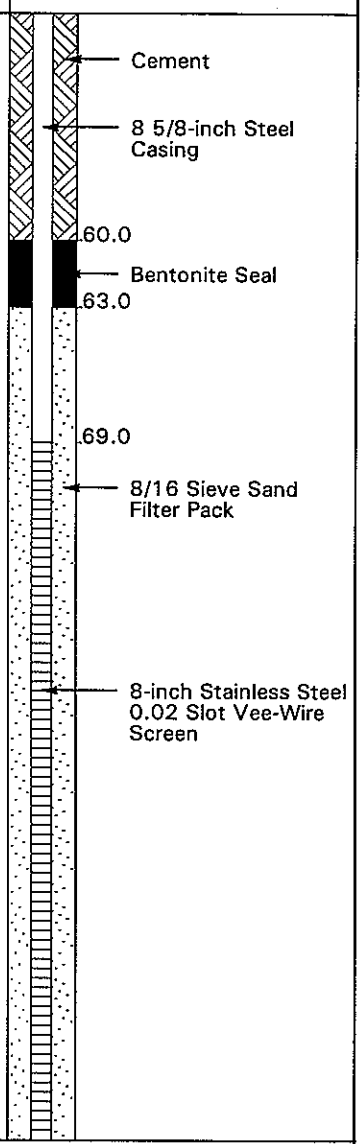
Silty Sand (SM) - Similar to above, 10-20% silt.

Silty Sand (SM) - Similar to above, moist at 70 feet.

Saturation at 76 feet below grade.

Silty Sand (SM) - Similar to above with occasional sandstone seams, saturated.

Silty Sand(SM) - Similar to above.



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F-204A Austin (8-95)

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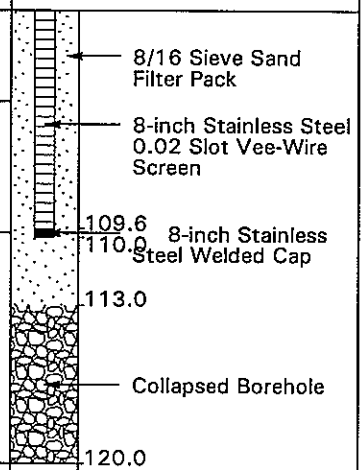
WELL CONSTRUCTION LOG

WELL NO. RIW-213

Client:		Start Date:	End Date:	Page of
FINA OIL AND CHEMICAL COMPANY		10-23-96	10-24-96	3 3
Site:		Drilling Method:		Project Number:
BIG SPRING, TEXAS		AIR/MUD ROTARY		50-01858.16
Geologist:	Driller:	Drill Rig Type:		Borehole Diameter:
TRACY PAYNE	CHOATE WELL SERVICE	GARDNER-DENVER 1500		12.25 Inches
Site Coordinates, UTM in ft.:	Total Depth (ft-bgl):	Surface Elevation(ft)	TOC Elevation(ft)	PAD Elevation(ft)
N: 239301.7500 E: 789629.8800	120.00	2453.30	2456.26	2453.76
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (feet)	Saturation	OVM (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				101–104		Sandy Clay (CL) - Low plasticity, 20% fine sand, very soft, saturated, red.
				105–109		Gravel (GW) - Well graded, subangular to subrounded, compact, granule to pebble, saturated.
				110–120		Clay (CH) - High plasticity, stiff, red, dry, Dockum Formation.
				121–149		BORING TERMINATED AT 120 FEET BELOW GRADE



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F-204A Austin (8-95)

ATTACHMENT XI.D.3.C(2A)-B - TREATMENT SYSTEM INFORMATION

MK Environmental Inc.
7150 S. Madison Street
Willowbrook, IL. 60527
630-920-1104Phone
630-920-8013 Fax

LP SERIES CASCADE AIR STRIPPER

MK CASCADE LOW PROFILE AIR STRIPPER

The Cascade LP150 Series Low Profile Air Stripper is a treatment unit which removes 99.999% of dissolved volatile organic compounds from water. Flow rates range from 0-150 GPM. The flexible aeration tubes are suspended above the bottom of the tray and inject air downward into the tray. The action provides high turbulence in the presence of high amounts of inorganic compounds. Clean-out ports are provided to access aeration tubes for quick and easy maintenance. Available in either 304 Stainless Steel or epoxy coated carbon steel.

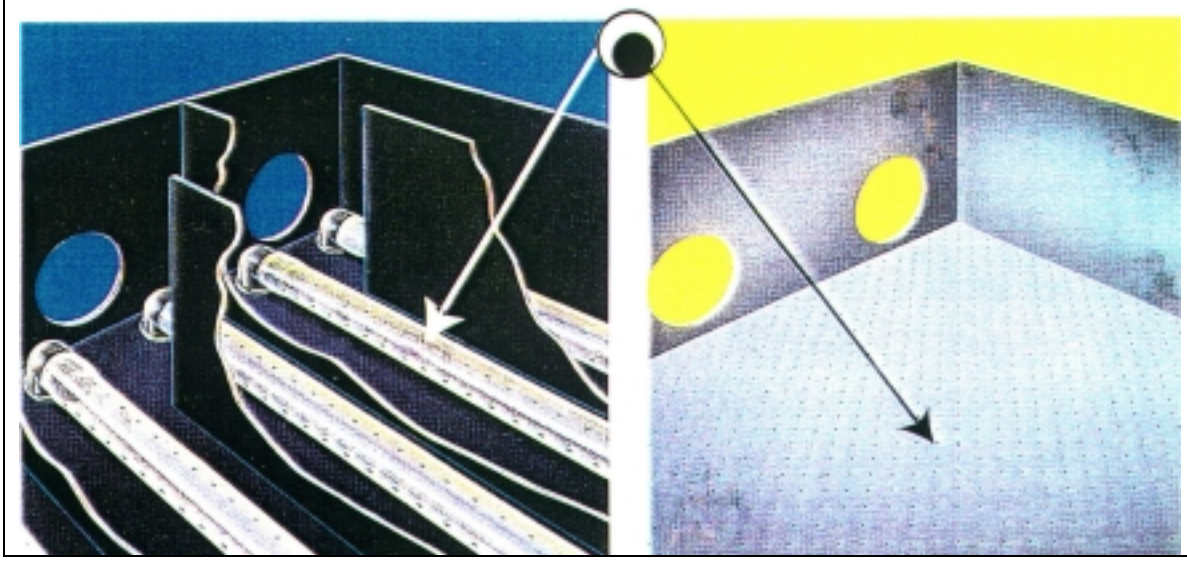
- Low profile air stripper treatment unit which removes high loads of dissolved volatile organic compounds from water
- Foul resistant flexible aeration diffuser nylon tube design
- Integral effluent sump
- Clean out ports with pop-off aeration tubes
- Infinite turn down, will perform at any flow rate less than design
- 800 CFM air flow design
- Up to 150 GPM applications

REMOVAL EFFICIENCY

60 Degree F Water Temperature, BTEX removal(s)

Flow:	1 Tray	2 Tray	3 Tray	4 Tray	5 Tray
10 gpm	99.85	99.97	99.999		
25 gpm	97.07	99.85	99.995		
50 gpm	86.68	98.88	99.89	99.98	99.999
100 gpm	58.56	88.72	97.05	99.14	99.74

Which Air Stripper Would You Rather Clean?



MK CASCADE

AERATION TUBES

- **Suspended above any solid deposits**
- **Large diameter holes difficult to plug**
- **Thin wall makes bridging difficult to impossible**
- **Cleaned by removing through clean-out ports & flexing the nylon tube to crack off calcium**
- **Trays can be cleaned with a shop vac. Removal not necessary**
- **Zero flow, no problem**

"Typical Sieve Tray"

Porous Plate

- **Where else can solids go?**
- **Where else can solids go?**
- **Clean-out ports to insert wash wand at 900 psi. In difficult cases use electric drill**
- **Weeping at low flows**

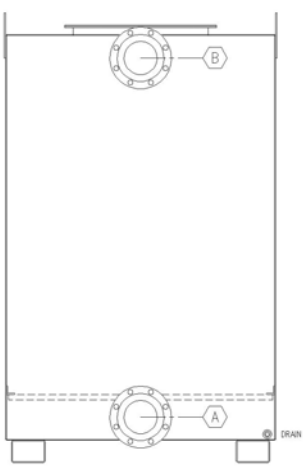
MK Environmental Inc.
7150 S. Madison Street, Willowbrook, IL. 60527
630-920-1104 630-920-8013 fax mkenv.com

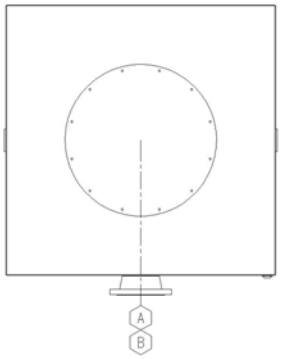
PRODUCT DATA SHEET

V3 SERIES FILTERS

V3 series filters are designed to treat vapor streams in a wide variety of adsorption applications. The modular design enables the units to easily fit into a wide variety of installations. Standard features include steel construction with epoxy internal coating, efficient internal distributor array, forklift skid and lifting eyes.

A wide variety of options and contact medias are available, contact our sales and engineering team to assist in your application.





A - Process Inlet
B - Process Outlet (on vessel top V3-108 thru V3-720)
C - Drain
Manway standard size 20" Round. Quantity 2 each for V3-108 and V3-180. Quantity 4 each for V3-360 and V3-720.

Standard Model Shown - Detailed Submittal Drawings Available

V3 SERIES STANDARD SPECIFICATIONS

Model Number	V3-18	V3-36	V3-72	V3-108	V3-180	V3-360	V3-720
Overall Height	3'11"	5'3"	6'5"	7'7"	7'10"	9'0"	9'4"
Footprint	3'x3'	4'x4'	4'x4'	4'x6'	6'x8'	8'x10'	8'x20'
Process Connection	4" ANSI	6" ANSI	6" ANSI	8" ANSI	10" ANSI	12" ANSI	18" ANSI
Typical GAC Fill (28#/FT³)	500 Lbs	1,000 Lbs	2,000 Lbs	3,000 Lbs	5,000 Lbs	10,000 Lbs	20,000 Lbs
Shipping Weight (empty)	400 Lbs	450 Lbs	650 Lbs	1,500 Lbs	2,100 Lbs	4,500 Lbs	8,350 Lbs
Operational Weight	1,020 Lbs	1,750 Lbs	3,250 Lbs	5,400 Lbs	8,600 Lbs	17,500 Lbs	34,850 Lbs
Cross Sectional Bed Area	9 FT^2	12 FT^2	12 FT^2	24 FT^2	48 FT^2	80 FT^2	160 FT^2
Available Bed Volume	18 FT^3	36 FT^3	72 FT^3	108 FT^3	180 FT^3	360 FT^3	720 FT^3
Maximum Pressure	3 PSIG	2 PSIG	2 PSIG	1 PSIG	1 PSIG	1 PSIG	1 PSIG
Maximum Vacuum	8" Hg	6" Hg	4" Hg	2" Hg	1" Hg	NR	NR

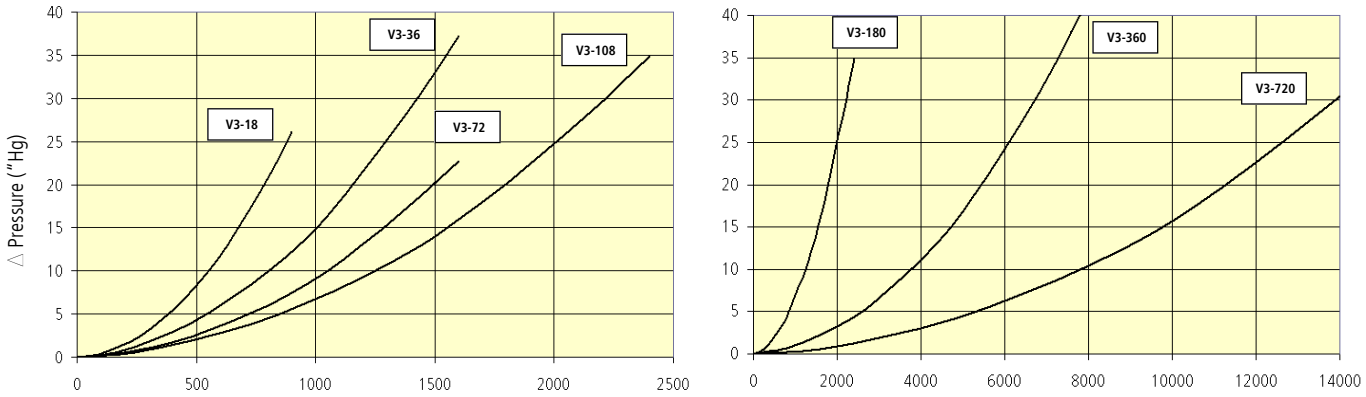
1200 East 26th Street – Anderson, Indiana 46016 Phone: (765) 643-3941 Fax: (765) 643-3949 www.tetrasolv.com

V3 SERIES FILTERS

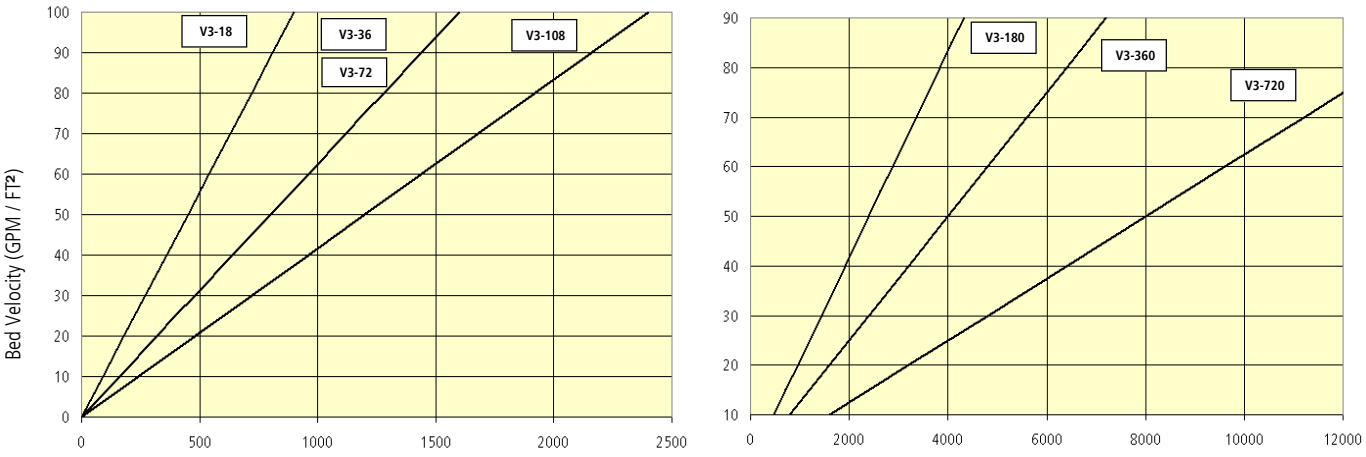
4x10 BITUMINOUS ACTIVATED CARBON

The following pressure drop graphs can be used for assistance in sizing blowers, etc. When utilizing pressure drop graphs it is important to consider the resultant figures represent typical start up conditions for a single unit. Pressure drop is measured from inlet nozzle to discharge nozzle. Certain conditions can cause extreme pressure drop increases over time.

Pressure Drop Graph for V3 Series Vessels

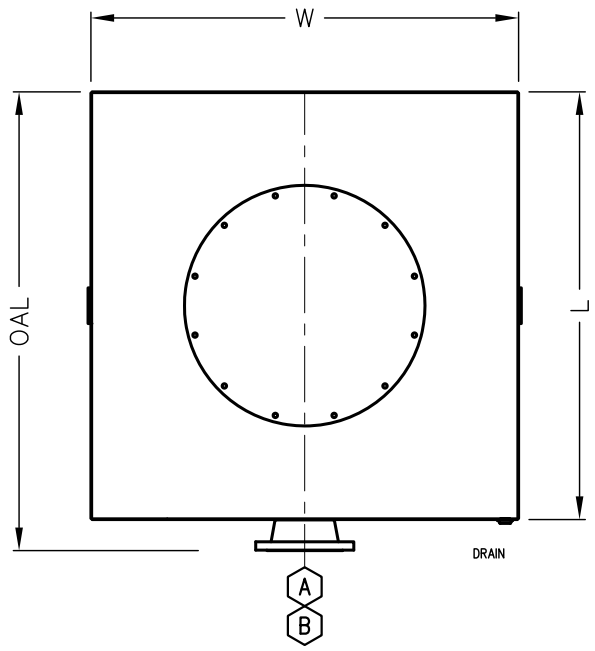


Bed Velocity Graph



The above bed velocity charts should be used when selecting the proper bed area related to flow-rate. This concern is primarily mechanical. Other factors should be considered when selecting the proper adsorber size. Bed velocities below 20 CFM/FT² increase the chances of unequal bed usage or "channeling". Bed velocities for up-flow configured adsorbers above 60 CFM/FT² can lead to bed fluidizationcausing loss of media.

1200 East 26th Street – Anderson, Indiana 46016 Phone: (765) 643-3941 Fax: (765) 643-3949 www.tetrasolv.com



PLAN VIEW

TRUE ORIENTATION

GENERAL CONSTRUCTION NOTES

- ACTUAL MODEL DRAWING MAY DIFFER FROM DIMENSIONAL SKETCH
- VALVES ARE FULL-PORT BRONZE BALL VALVES
- LOWER PLENUM SYSTEM 304SS PERFORATED PLATE
- V3-108 THRU V3-180 HAVE (2) MANWAYS
- V3-360 THRU V3-720 HAVE (4) MANWAYS

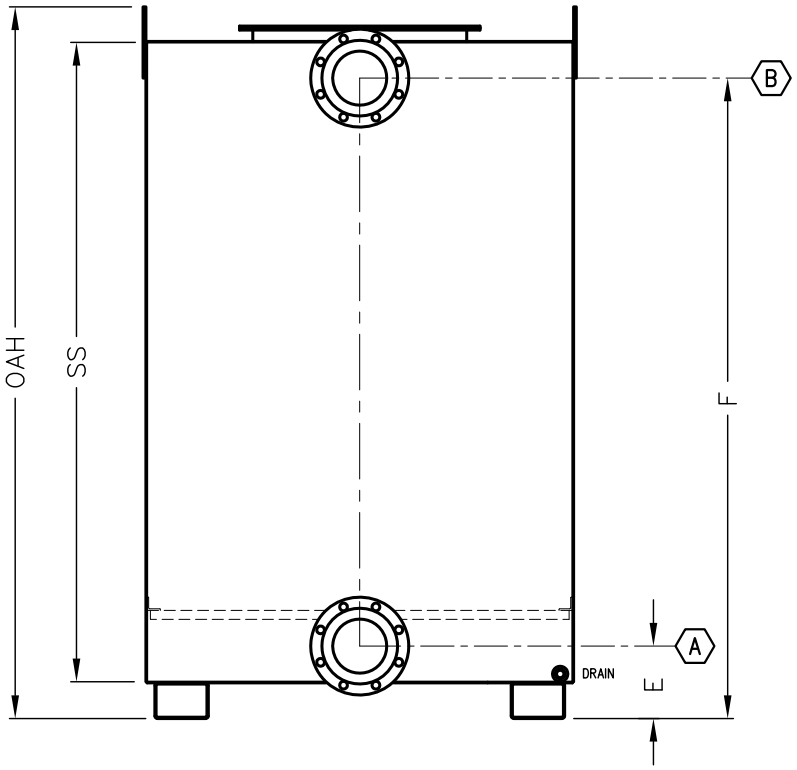
COATINGS

INTERNAL:
- BLAST SSPC-SP10 2 MIL ANCHOR PROFILE
- 1 COATS SHERWIN WILLIAMS DURA-PLATE 235 6 MILS DFT

EXTERNAL:
- ALL NON-FERROUS SURFACES NOT COATED
- FERROUS SURFACES TO BE BLASTED SSPC-SP6
- 1 COATS SHERWIN WILLIAMS MACROPOXY 626 4-5 MILS DFT
- 1 COAT SHERWIN WILLIAMS ACROLINE 218HS 3-4 MILS DFT (TAN)

NOTES

ACTUAL MODEL MAY VARY FROM SERIES DRAWING
SEE MODEL SPECIFIC DRAWING FOR ACTUAL CONSTRUCTION DETAILS



ELEVATION VIEW

NOT TRUE ORIENTATION

MODEL	OAH	E	SS	OAL	DRN	F	L	W
V3-18	55	7	48	39	½	49	36	36
V3-36	55	8	48	52	½	48	48	48
V3-72	79	8	72	52	½	72	48	48
V3-108	79	9	72	52	½	71	48	72
V3-180	79	10	72	76	1	70	72	72
V3-360	91	11	96	101	1	81	96	120
V3-720	91	12	96	245	1	82	96	240

tetraSOLV FILTRATION

Tetrasolv Filtration - 1200 E. 26th Street - Anderson, IN 46016
Phone (765) 643-3941 Fax (765) 643-3949

V3 SERIES DIMENSIONAL SKETCH

ATTACHMENT XI.D.3.C(2A)-C - WELL INSTALLATION FIELD FORMS

FIELD BORING LOG

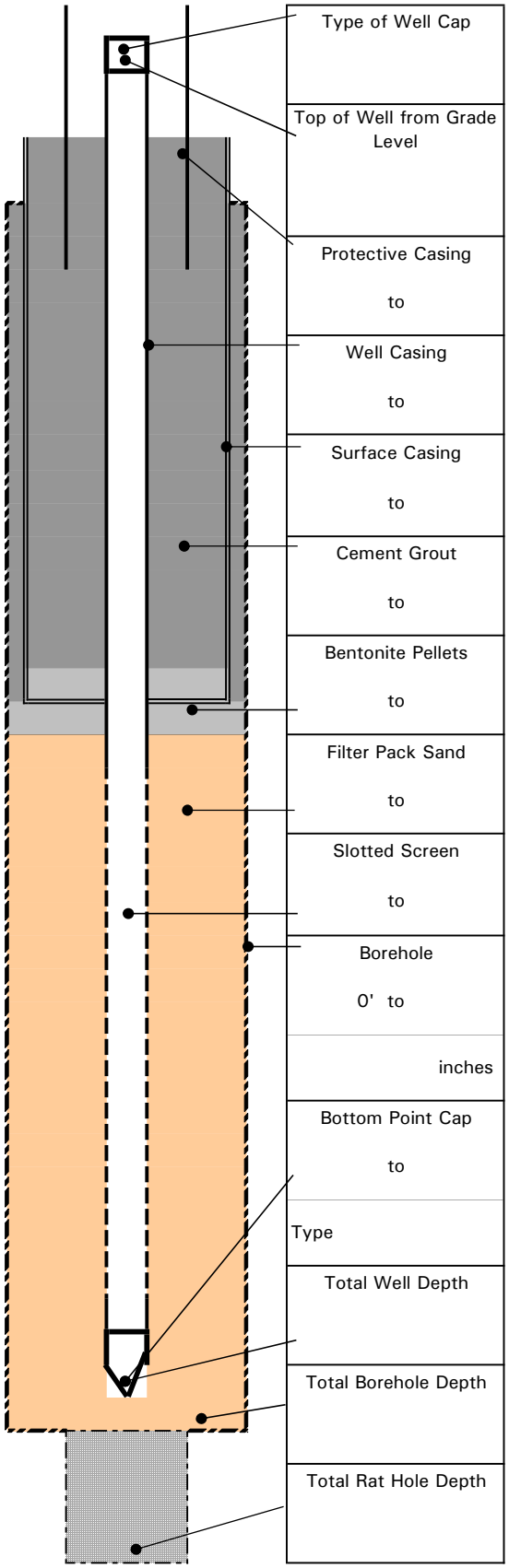
Client:	Job No.	Boring/ Well No.	
Project:	Location	Sheet of	
Groundwater Depth:	Total Depth Drilled	Date Drilled:	
Drilling Method(s)	Drilling Rig Model	Logged By:	
Sampling Methods		Driller & Lic#	
Comments:		Time Start	
		Time Finish	

Inner-Auger Core Barrel					
Interval Cored (feet below grade)	**Length Recov'd**	**OVM Reading**	**Sample No.**	**USCS Symbol**	**Sample Description**
to					

FIELD WELL COMPLETION DATA FORM

Client:	Job No.
Project:	Location
Project Manager	Date Installed:
Geologist:	License No.
Top Saturation:	Type Rig: [ ] Hollow St [ ] GeoProbe [ ] Rotary --- ( )Air ( )Water
Drilling Method(s)	Total Depth Drilled
Drilling Company:	Drilling Rig Model
Driller	License No.

Well Name:



DEVELOPMENT

Method Used:	[ ]Over-Pump [ ]Bail	[ ]Air Jet [ ]Water Jet	[ ]Other (describe):	
Began:	Date & Time:	Finish:	Date & Time:	
PRE	pH	Turbidity	Specific Conductance	Temp.
POST	pH	Turbidity	Specific Conductance	Temp.
Volume Removed		Rate of Removal		
Water Disposal To:		**Use Well Development Form For Detailed Record**		

MATERIALS USED

Filter Pack Sand	# Sacks	Sieve Size	Manufacturer	
Bentonite Pellets	# Pails	Pellet Size	Manufacturer	
Cement - Bentonite Grout	# Sacks Cement	Grade Type	Manufacturer	
	Grout Weight (lbs / gallon)			
	# Sacks Bentonite	Grade Type	Manufacturer	
Blank Casing	# Feet	Diameter		Manufacturer
Slotted Screen	# Feet	Diameter	Slot Size	
Surface Casing	# Feet	Diameter	Type [ ] PVC [ ] Stainless [ ] Black Steel	
Surface Protection	[ ]Flush [ ]Stand	Dia. Of Pipe	Locking? [ ] YES [ ] NO	
Other	Surface Pad Size:		Depth to Centralizers:	

WELL DEVELOPMENT RECORD

Alon USA Big Spring Refinery	Well Numbeer

Date: _____

(A) Static Water Level: _____ feet below Top of Casing (BTOC)

(B) Original Borehole Depth: _____ feet BTOC

(C) Water Column (h): _____ feet…..[(B) - (A)]

(D) Borehole Diameter (d): _____ inches

_____ feet…..[(D) / 12]

(E) Borehyole Radius (r): _____ inches

_____ feet…..[(E) / 12]

(F) Purge Vollume (V)[1] _____ gallons….[(C) x 3.264)]

(G) Production Rate (Q): _____ gallons per minute

(H) Final Water Level: _____ feet BTOC

(1): Formula for calculating Purge Volume (12-inch borehole with 8-inch well) =

$V_{gallons} = ((B)_{feet} - (A)_{feet}) \times 3.264$ gallons per linear fppt

Gallons Purged	Time	Water Level (ft-BTOC)	Temperature (°C)	pH (stnd units)	Specific Conductance µmhos/cm)	Visual Water Quality

Temperture Units:	**Specific Conductance Units:**
Time Started:	**Name of Technician:**
Time Completed:	**Name of Geologist:**

Drilling Method Used:

- ☐ **Air Rotary**
- ☐ **Potable Water Only**
- ☐ **Other:** _____
- ☐ **Mud Additives**
- ☐ **Auger Only**

Alon USA, LP

Big Spring Refinery – Big Spring, Texas

Attachment XI.D.3.c(2)b

Monitoring System Plan
SWR30083 / CP50140 / RN100250869 / CN600881783

January 2024

Robert L. Sherrill, PG
Geologist

Signature

Texas PG-120
Registration Number

Atlas Technical Consultants, LLC
TX#56038
Texas Geoscience Firm & Registration Number

January 28, 2024
Date

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ATTACHMENT XI.D.3.c(2)b-B Monitor Well Construction Logs – BICA Area
ATTACHMENT XI.D.3.c(2)b-C Monitor Well Construction/Development Forms

SECTION 1 GENERAL INFORMATION

1.1 Introduction

The current compliance monitoring system has been utilized since 2000 and is comprised of the following well components with their sampling method indicated:

- BICA AREA System Wells:

MW-52	Low-Flow	RW-146	Vol. Purge	RW-194	Vol. Purge
MW-52A	Low-Flow	RW-147	Vol. Purge	RW-195	Vol. Purge
IW-58	Low-Flow	IW-149	Low-Flow	MW-214	Low-Flow
IW-58A	Low-Flow	IW-149A	Low-Flow	MW-214A	Low-Flow
MW-76	Low-Flow	IW-150	Low-Flow	MW-215	Low-Flow
MW-76A	Low-Flow	IW-150A	Low-Flow	MW-215A	Low-Flow
MW-78	Low-Flow	MW-152	Low-Flow	MW-218	Low-Flow
MW-78A	Low-Flow	MW-152A	Low-Flow	MW-218A	Low-Flow
MW-79	Low-Flow	MW-153	Low-Flow	MW-220	Low-Flow
MW-79A	Low-Flow	MW-153A	Low-Flow	MW-220A	Low-Flow
MW-80	Low-Flow	MW-154	Low-Flow	MW-221	Vol. Purge
MW-80A	Low-Flow	MW-154A	Low-Flow	MW-221A	Low-Flow
RW-106	Vol. Purge	MW-155	Low-Flow	MW-223	Low-Flow
MW-109	Low-Flow	MW-155A	Low-Flow	MW-223A	Low-Flow
MW-109A	Low-Flow	MW-163	Low-Flow	MW-224	Low-Flow
RW-112	Vol. Purge	MW-163A	Low-Flow	MW-224A	Low-Flow
MW-125	Low-Flow	MW-165	Low-Flow	MW-225	Low-Flow
MW-125A	Low-Flow	MW-165A	Low-Flow	MW-225A	Low-Flow
RW-141	Vol. Purge	MW-166	Low-Flow	MW-227	Low-Flow
RW-142	Vol. Purge	MW-166A	Low-Flow	MW-227A	Low-Flow
RW-144	Vol. Purge	RW-179	Vol. Purge		
RW-145	Vol. Purge	RW-192	Vol. Purge		

- Site E Land Treatment Unit System Wells:

MW-38	Low-Flow	MW-39A	Low-Flow	MW-41	Low-Flow
MW-38A	Low-Flow	MW-40	Low-Flow	MW-41A	Low-Flow
MW-39	Low-Flow	MW-40A	Low-Flow		

Table XI.D.3.c.(2)b-1 is a summary of the well construction for each of the 72 well components that make up the compliance monitoring system. Attachment XI.D.3.c.(2)b-A contains copies of the monitoring well construction logs for Site E and Attachment XI.D.3.c.(2)-B contains copies of the monitoring well construction logs for the BICA Area monitoring system. Figure XI.D.3.c.(2)b-1 is a map of the locations of the compliance monitor wells.

SECTION 2 MONITORING SYSTEM DESIGN AND SPECIFICATIONS

2.1 Introduction

This Section will discuss the general system design that is applied to all monitor wells.

2.2 Well Nomenclature

All wells installed at the Delek Alon Big Spring facility, no matter the purpose of the well, are numbered in numerical order. The intended purpose of the well is designated by the prefix letters in the well ID. The prefixes include:

- MW- Monitoring Wells
- RW- Recovery Production/Skimming Wells
- RIW- Reinjection Wells (Class V wells)
- IW- Investigation Wells (unknown conditions)
- DW- Delineation Wells (known conditions)

Following the prefix well use notation is the numerical sequence number. If conditions warrant a cluster well set (see Section 2.3), a suffix letter "A" is added to the end of the numeric well sequence number for the well screening the deeper basal gravel. No suffix appears on the ID of the shallow saturated sand wells.

If the well is a replacement well for a damaged or destroyed well, then the well ID will have a "-R" attached to the end of the ID name.

The following are examples of the well nomenclature used:

MW-999	Monitor well number 999 that is screened in the upper saturated sands;
DW-999A	Delineation well number 999 that is screened in the lower basal gravels;
RW-999-R	Recovery well replacing recovery well number 999. Note that if the replacement well cannot be located within 25-feet of the well being replaced, it is assigned the next well number and follows the above nomenclature without the "-R" designation; and
DW-999A-R	Replacement for delineation well shown above.

2.3 Well Screen Configuration

Were a minimum of 3-feet of basal gravel exists below the saturated sand and at the top of the Dockum red bed clays, a two-well cluster pair will be installed. The deep well of each cluster pair will be drilled to a depth no less than 15-feet into the Dockum red-bed clay to ensure that the formation has been identified. Once the lithologic conditions are known, a decision will be made in the field as to the screening intervals for both the shallow and the deep wells. The object of the cluster wells is to screen the aquifer in such a way as to isolate groundwater samples from the upper saturated sand and the lower gravels. For each cluster well pair, UNDER

NO CIRCUMSTANCES will the upper screened interval well either overlap the deep well screened interval or intercept any basal gravel unit within the shallow well screened interval.

The shallow well of each cluster will screen no more than the upper 18-feet of saturated sand (with two-feet extended above saturation) and the deeper well of each cluster will screen only the basal gravel unit. All decisions concerning cluster sets will be made following the gathering of well location-specific hydrogeologic information by drilling and logging the lithology and degree of saturation through the saturated sand, basal gravel and into the Dockum red-bed clay. That borehole will then be utilized for the deep well of the cluster pair. The shallow well of the cluster will then be drilled and installed greater than 8-feet but no more than 20-feet from the deep well.

Figure XI.D.3.c.(2)b-2 is a schematic of a typical cluster well installation.

SECTION 3 WELL DRILLING AND WELL CASING SPECIFICATIONS

3.1 Introduction

This Section will discuss the specific of site preparation, drilling and sampling, and well installation for monitor wells installed at the facility.

3.2 Well Site Preparation

Prior to the drilling and installation of any proposed wells, the following procedures will be conducted to insure utility clearance and the installation of the surface sleeve:

- The proposed locations will be staked in the field and will be outside any known easement right-of-way for buried pipelines, conduits, or cables and overhead power and telephone lines.
- A survey for buried utilities will be conducted by a contract surveyor and will include a review of easement plats and the performance of a magnetic survey of the immediate area (i.e., buried line locator).
- Within 10 days of the start of drilling, One-Call will be contacted by Alon or their representative in order to get utility identification and marking. Any well deemed to be "too close" by the One-Call service will be moved so as to meet the required distances.

3.3 Drilling and Sampling

The following drilling and sampling methods will be used for the installation of the monitor wells:

- A minimum four-inch (4") borehole will be advanced using an air-rotary method with minimal potable water mist until the top of saturation is determined.
- Following determination of the top of saturation, a potable water drilling fluid (with no drilling mud or other additives) can be used to advance the borehole if needed.
- Once the top of the basal gravel interval (if present) is determined and the Dockum Red Bed Formation is encountered, a "rat-hole" will be drilled to a depth of 15-feet into the Dockum to confirm that the clay is not a paleo-erosional unit or "False Red Bed".
- Following completion of the four-inch (4") pilot hole, the borehole will be reamed to a minimum diameter of 10-inches and the borehole cleaned to the top of the clay. The borehole will be cleaned by circulating the drilling fluid until minimal cuttings are returned. The borehole will be logged based on cuttings and split-spoon samples collected every ten-feet (10'). All logging will be performed by the on-site geologist at the time of sample collection using the Unified Soil Classification System (USCS).

Attachment XI.D.3.c.(2)b-B contains the Well Boring Log that will be completed at the time of the drilling of each borehole.

3.4 Well Installation

The wells will be installed immediately after removal of the drill stem from the borehole using the methods describe below or their equivalent. A detailed listing of the type of materials that will be used for monitor well construction is compiled in Table XI.D.3.c.(2)b-2.

1. During the assembly of each of the wells, a threaded sand point will be attached to the bottom joint of the screen. A stainless steel centralizer will be attached to the well casing approximately twelve-feet (12') above the top of the screened interval. The casing will then be assembled as it is lowered into the borehole to the proper depth.
2. After the casing and screen is in place and secured with a pipe vise, a 1.5-inch to 2-inch PVC threaded tremie pipe will be lowered into the annulus to a depth five-foot (5') above the uppermost screened interval. The filter pack material will be placed through the tremie pipe until the filter pack material is measured at three-feet (3') above the top of the screened interval. All measurements will be made with a weighted tape through the tremie pipe in order to prevent entanglement on the centralizer.
3. The tremie pipe will then be removed from the borehole and a bentonite pellet filter pack seal will be slowly poured into the annulus from the surface. After allowing approximately 15 minutes for the settling and initial swelling of the pellets, the tremie pipe will be re-placed into the annulus to maximum depth of eight-feet (8') above the top of the screened interval and a weighted tape will be lowered through the tremie pipe to determine the top of the bentonite seal. A minimum of three-feet (3') of bentonite seal must be in place. *Note: All Measurements Made With The Weighted Tape Will Be Referenced To Grade Surface Level.*
4. After allowing at least one hour for the filter pack seal (since time of placement) to further swell, the tremie pipe will be raised to a level no more than five-feet (5') above the top of the bentonite and a cement/bentonite grout will then be slowly pumped through the tremie pipe to seal the annulus from the top of the bentonite to grade level (the tremie pipe may be raised in stages once the grout mixture is above the bottom of the tremie pipe). The cement/bentonite grout will be mixed in proportions of 80-pounds Portland Type I-II cement, 3.5-pounds of bentonite gel (or approximately 5% by weight) in sufficient potable water to create a 12 to 13 pounds per gallon mixture as determined by the driller using a mud weight scale. The steel protective casing will be centered over the PVC well head with the top of the uncapped well flush with top shoulder of the protection casing (i.e., the top of the protective casing stick-up without the lid). A minimum of 24-hours will be allowed for the annulus seal to cure and shrink before proceeding.
5. At the end of the curing period, any annulus resulting from curing will be filled with a grout mix as described above.
6. Once the deep well (designated as "MW-#A") has been drilled and installed, the shallow well will be drilled and installed within no less than 8-feet and no more than 20-feet of the deep well's location. As such, sampling will not be necessary other than to confirm the top of saturation. Installation will be as discussed above.
7. Following well development (discussed below), a six-feet by six-feet by six-inch (6' x 6' x 6") reinforced concrete surface seal diversion pad will then be formed and constructed centered around and sloping away from the well head. The diversion pad

will be constructed two-inches (2") below and four-inches (4") above grade. The pads may be constructed following the completion of all wells for that instillation event.

8. Surveying and labeling of the wells will be the responsibility of the Refinery or their representative. The top of well casing elevation will be at a marked point on the north side of the top of the well casing.

Figure XI.D.3.c.(2)b-2 is a schematic drawing showing the well cluster pair idealized settings.

Attachment XI.D.3.c.(2)b-B contains the well construction log that will be completed at the time of well installation.

3.5 Well Development

Each monitor well will be developed using an air-lift/water hammer method (or other approved methods) utilizing an air compressor with an industrial air filter. Monitor well development will be terminated when ALL the following three conditions, at a minimum, have been met:

1. A minimum of three times the original borehole volume of groundwater has been removed from the well;
2. The specific conductance and pH of the ground water has stabilized over a one borehole volume removal period (5% deviation for specific conductance and 0.2 standard units for pH; and
3. The groundwater has become free of silt and sand.

Attachment XI.D.3.c.(2)b-B contains the well development log which will be completed during the well development.

It is the responsibility of the driller that all drilling fluids and development water will be captured in 55-gallon drums or other appropriate container. Alon USA Refinery will arrange for a vacuum truck to remove the water following completion of the project. All cuttings will be stored on and covered by plastic sheeting for removal by Alon USA Refinery following completion of the project.

3.6 Decontamination

Following completion of each well (and/or prior to entry into a new borehole/well), all drill stem, drill bits, sampling tools, tremie pipe and other down-hole tools as well as the drilling rig will be steam-cleaned. Alon USA Refinery will provide access to a high-pressure steam cleaner and decontamination area. The driller is responsible for all decontamination labor. All necessary efforts will be made not to track mud onto public or private roads. If needed, the driller will be responsible for the removal of any mud left on roadways.

3.7 Well Acceptance

After each monitor well has been installed and developed and all surface work is completed, a 1.6-inch by 3-feet long bailer will be lowered down the monitor well to the bottom in order to assure plumbness, accessibility, and effective development. After Alon is satisfied as to the installation and development quality, the well will be accepted.

TABLES

- Table XI.D.3.c(2)b-1 Summary of Existing Compliance Monitor Well Construction
- Table XI.D.3.C(2)B-2 Material Specifications

Table XI.D.3.c.(2)b-1

Summary of Existing Compliance Monitor Well Construction

Alon USA, LP Big Spring, Texas

Well ID Number	n/a	MW-38	MW-38A	MW-39	MW-39A	MW-40	MW-40A	MW-41	MW-41A	MW-52	MW-52A	IW-58	IW-58A
Program	n/a	SITE E	SITE E	SITE E	SITE E	SITE E	SITE E	SITE E	SITE E	BICA-LF	BICA-LF	BICA-LF	BICA-LF
Type of Program Well	n/a	BKGRD	BKGRD	POC	POC	POC	POC	POC	POC	BKGRD	BKGRD	POC	POC
Date Installed	n/a	Sep-87	Sep-87	Sep-87	Sep-87	Sep-87	Sep-87	Sep-87	Sep-87	Mar-89	Mar-89	Jul-90	Jul-90
Top of Casing	(MSL)	2500.28	2500.25	2485.47	2485.63	2480.01	2479.42	2489.34	2489.88	2517.86	2517.82	2437.84	2439.01
Top of Pad	(MSL)	2497.45	2497.58	2482.59	2482.88	2477.28	2477.32	2486.59	2487.05	2515.35	2515.33	2435.34	2346.38
Top of Grade	(MSL)	2497.28	2497.41	2482.59	2482.88	2477.03	2477.07	2486.26	2486.80	2515.10	2515.08	2435.09	2435.88
TSPC Grid System	NORTHING	243,667	243,661	243,128	243,113	242,865	242,862	243,095	243,108	247,820	247,818	238,752	238,737
	EASTING	791,185	791,170	790,962	790,967	791,227	791,217	791,359	791,358	790,138	790,127	792,324	792,357
Top of Basal Gravel (Ogallala FM)	(BGL)	110.0	110.0	99.0	99.0	108.0	108.0	106.5	106.5	137.0	137.0	85.0	85.0
	(MSL)	2,387.4	2,387.4	2,383.9	2,383.9	2,369.1	2,369.1	2,380.3	2,380.3	2,378.1	2,378.1	2,350.3	2,350.3
	Thickness (FT)	34.0	34.0	30.0	30.0	19.5	19.5	23.5	23.5	20.0	20.0	13.0	13.0
Top of Dockum Clay (Dockum FM)	(BGL)	144.0	144.0	129.0	129.0	127.5	127.5	130.0	130.0	157.0	157.0	98.0	98.0
	(MSL)	2,353.4	2,353.4	2,353.9	2,353.9	2,349.6	2,349.6	2,356.8	2,356.8	2,358.1	2,358.1	2,337.3	2,337.3
Height of Riser Pipe	(feet)	3.0	2.8	2.9	2.8	3.0	2.3	3.1	3.1	2.8	2.7	2.8	3.1
Total Depth Drilled	(feet)	120.0	160.0	109.0	140.0	107.0	130.0	113.0	135.0	120.0	160.0	110.0	110.0
	(MSL)	2377.3	2337.4	2373.6	2342.9	2370.0	2347.1	2373.3	2351.8	2395.1	2355.1	2325.1	2325.9
Borehole Diameter	(inches)	6.75	6.75	6.75	6.75	6.75	6.75	6.75	6.75	6.75	6.75	6.75	6.75
Casing Size	(inches)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Casing Material	n/a	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC
Screen Size	(inches)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Screen Material	n/a	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC
Top Screen (1)	(BGL)	95.0	110.0	79.0	99.0	87.0	108.0	90.0	106.8	105.0	137.0	67.5	86.0
	(MSL)	2402.3	2387.4	2403.6	2383.9	2390.0	2369.1	2396.3	2380.0	2410.1	2378.1	2367.6	2349.9
Bottom Screen (1)	(BGL)	115.0	146.0	99.0	130.0	107.0	128.0	113.0	130.8	125.0	157.0	100.0	96.0
	(MSL)	2382.3	2351.4	2383.6	2352.9	2370.0	2349.1	2373.3	2356.0	2390.1	2358.1	2335.1	2339.9
Top Screen (2)	(BGL)	na	na	na	na	na	na	na	na	na	na	na	na
	(MSL)	na	na	na	na	na	na	na	na	na	na	na	na
Bottom Screen (2)	(BGL)	na	na	na	na	na	na	na	na	na	na	na	na
	(MSL)	na	na	na	na	na	na	na	na	na	na	na	na
Screen Mill-Slot Size (1) & (2)	(inches)	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.010	0.010	0.010	0.020
Top Filter Pack	(BGL)	93.0	108.0	77.0	97.0	85.0	106.0	88.0	104.0	102.8	134.8	64.5	82.0
	(MSL)	2404.3	2389.4	2405.6	2385.9	2392.0	2371.1	2398.3	2382.8	2412.3	2380.3	2370.6	2353.9
Filter Pack US Sieve Size	Sieves No.	10 - 16	10 - 16	10 - 16	10 - 16	10 - 16	10 - 16	10 - 16	10 - 16	10 - 16	10 - 16	10 - 16	10 - 16
Top Bentonite Seal	(BGL)	88.0	101.0	72.0	91.0	80.0	103.0	82.0	100.0	99.8	131.9	61.5	77.0
	(MSL)	2409.3	2396.4	2410.6	2391.9	2397.0	2374.1	2404.3	2386.8	2415.3	2383.2	2373.6	2358.9
Compresses Bentonite Size	(inches)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Locking Steel Cover?	Yes/No	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Drilling & Lithologic Log?	Yes/No	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Well Construction Log?	Yes/No	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Top Casing to Well Bottom	(feet)	118.00	148.84	101.88	132.75	109.98	130.35	116.08	133.88	127.76	159.74	102.75	99.13
Sampling Method	na	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow
Sample Collection Depth	(BTOC)	110.00	115.00	95.00	120.00	102.00	115.00	105.00	120.00	115.00	150.00	76.80	92.10
Fluid Level in Borehole (assumed top saturation)	(feet)	96.0	96.0	80.0	80.0	88.0	88.0	91.0	91.0	115.0	115.0	70.0	70.0
	(MSL)	2401.4	2401.4	2402.9	2402.9	2389.1	2389.1	2395.8	2395.8	2400.1	2400.1	2365.3	2365.3
	Thickness (feet)	48.0	48.0	49.0	49.0	39.5	39.5	39.0	39.0	42.0	42.0	28.0	28.0

BKGND - Background Well
POC - Point of Compliance Well
n/a - Not Applicable
MSL - feet Mean Sea Level
BGL - feet Below Grade Level

Table XI.D.3.c.(2)b-1

Summary of Existing Compliance Monitor Well Construction

Alon USA, LP Big Spring, Texas

Well ID Number	n/a	MW-76	MW-76A	MW-78	MW-78A	MW-79	MW-79A	MW-80	MW-80A	RW-106	MW-109	MW-109A	RW-112
Program	n/a	BICA-LF	BICA-LF	BICA-LF	BICA-LF	BICA-LF	BICA-LF	BICA-LF	BICA-LF	BICA-VP	BICA-LF	BICA-LF	BICA-VP
Type of Program Well	n/a	BKGRD	BKGRD	POC	POC	POC	POC	POC	POC	POC	POC	POC	POC
Date Installed	n/a	Jun-92	Jun-92	Jun-92	Jun-92	Jun-92	Jun-92	Jun-92	Jun-92	Aug-92	Feb-93	Feb-93	Sep-93
Top of Casing	(MSL)	2522.21	2521.89	2418.59	2418.85	2439.07	2438.74	2443.30	2442.71	2442.67	2370.71	2370.47	2387.48
Top of Pad	(MSL)	2519.47	2519.14	2415.95	2416.19	2436.40	2436.07	2440.68	2439.91	2440.58	2367.91	2367.71	2385.54
Top of Grade	(MSL)	2519.40	2518.99	2415.90	2416.19	2436.21	2436.01	2440.55	2439.85	2440.41	2367.68	2367.48	2385.54
TSPC Grid System	NORTHING	247,976	247,975	237,751	237,742	237,968	237,965	238,486	238,542	240,133	236,671	236,685	237,781
	EASTING	790,630	790,621	791,128	791,128	792,296	792,288	790,471	790,460	791,444	791,459	791,463	791,370
Top of Basal Gravel (Ogallala FM)	(BGL)	NE	NE	66.0	66.0	92.0	92.0	80.0	80.0	NE	20.0	20.0	40.0
	(MSL)	NE	NE	2,350.2	2,350.2	2,344.0	2,344.0	2,359.9	2,359.9	NE	2,347.7	2,347.7	2,345.5
	Thickness (FT)	NE	NE	6.0	6.0	19.0	19.0	28.0	28.0	NE	4.0	4.0	4.0
Top of Dockum Clay (Dockum FM)	(BGL)	158.0	158.0	72.0	72.0	111.0	111.0	108.0	108.0	NE	24.0	24.0	44.0
	(MSL)	2,361.0	2,361.0	2,344.2	2,344.2	2,325.0	2,325.0	2,331.9	2,331.9	NE	2,343.7	2,343.7	2,341.5
Height of Riser Pipe	(feet)	2.8	2.9	2.7	2.7	2.9	2.7	2.8	2.9	2.3	3.0	3.0	1.9
Total Depth Drilled	(feet)	130.0	180.0	65.0	90.0	80.0	120.0	130.0	120.0	86.0	41.0	36.0	60.0
	(MSL)	2389.4	2339.0	2350.9	2326.2	2356.2	2316.0	2310.6	2319.9	2354.4	2326.7	2331.5	2325.5
Borehole Diameter	(inches)	6.75	6.75	6.75	6.75	6.75	6.75	6.75	6.75	12.25	6.75	6.75	12.25
Casing Size	(inches)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	6.0	2.0	2.0	6.0
Casing Material	n/a	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC
Screen Size	(inches)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	6.0	2.0	2.0	6.0
Screen Material	n/a	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC
Top Screen (1)	(BGL)	100.0	138.0	39.0	66.0	51.0	91.0	61.0	78.0	50.0	3.0	14.0	20.0
	(MSL)	2419.4	2381.0	2376.9	2350.2	2385.2	2345.0	2379.6	2361.9	2390.4	2364.7	2353.5	2365.5
Bottom Screen (1)	(BGL)	120.0	158.0	59.0	72.0	71.0	111.0	81.0	108.0	85.0	22.0	24.0	35.0
	(MSL)	2399.4	2361.0	2356.9	2344.2	2365.2	2325.0	2359.6	2331.9	2355.4	2345.7	2343.5	2350.5
Top Screen (2)	(BGL)	na	na	na	na	na	na	na	na	na	na	na	40.0
	(MSL)	na	na	na	na	na	na	na	na	na	na	na	2345.5
Bottom Screen (2)	(BGL)	na	na	na	na	na	na	na	na	na	na	na	45.0
	(MSL)	na	na	na	na	na	na	na	na	na	na	na	2340.5
Screen Mill-Slot Size (1) & (2)	(inches)	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
Top Filter Pack	(BGL)	98.0	127.0	34.0	63.0	48.0	89.0	57.0	73.0	42.0	2.0	22.0	16.0
	(MSL)	2421.4	2392.0	2381.9	2353.2	2388.2	2347.0	2383.6	2366.9	2398.4	2365.7	2345.5	2369.5
Filter Pack US Sieve Size	Sieves No.	10 - 16	10 - 16	10 - 16	10 - 16	10 - 16	10 - 16	10 - 16	10 - 16	10 - 16	10 - 16	10 - 16	10 - 16
Top Bentonite Seal	(BGL)	89.0	108.0	27.0	55.0	41.0	81.0	51.0	66.0	38.0	1.0	19.0	12.0
	(MSL)	2430.4	2411.0	2388.9	2361.2	2395.2	2355.0	2389.6	2373.9	2402.4	2366.7	2348.5	2373.5
Compresses Bentonite Size	(inches)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Locking Steel Cover?	Yes/No	YES	YES	YES	YES	YES	YES	YES	YES	Recovery	YES	YES	Recovery
Drilling & Lithologic Log?	Yes/No	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Well Construction Log?	Yes/No	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Top Casing to Well Bottom	(feet)	122.81	160.90	61.69	74.66	73.86	113.73	83.75	110.86	87.26	25.03	26.99	36.94
Sampling Method	na	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Vol Purge	Low Flow	Low Flow	Vol Purge
Sample Collection Depth	(BTOC)	106.00	122.00	61.00	71.66	68.86	113.00	72.75	92.86	57.50	13.03	22.99	46.00
Fluid Level in Borehole (assumed top saturation)	(feet)	101.0	101.0	40.0	40.0	52.0	52.0	62.0	62.0	58.0	4.0	4.0	23.0
	(MSL)	2418.0	2418.0	2376.2	2376.2	2384.0	2384.0	2377.9	2377.9	2384.7	2363.7	2363.7	2362.5
	Thickness (feet)	57.0	57.0	32.0	32.0	59.0	59.0	46.0	46.0	*NFP*	20.0	20.0	19.0

BKGND - Background Well
POC - Point of Compliance Well
n/a - Not Applicable
MSL - feet Mean Sea Level
BGL - feet Below Grade Level

Table XI.D.3.c.(2)b-1

Summary of Existing Compliance Monitor Well Construction

Alon USA,LP Big Spring, Texas

Well ID Number	n/a	MW-125	MW-125A	RW-141	RW-142	RW-144	RW-145	RW-146	RW-147	IW-149	IW-149A	IW-150	IW-150A	MW-152
Program	n/a	BICA-LF	BICA-LF	BICA-VP	BICA-VP	BICA-VP	BICA-VP	BICA-VP	BICA-VP	BICA-LF	BICA-LF	BICA-LF	BICA-LF	BICA-LF
Type of Program Well	n/a	POC	POC	Recovery	Recovery	Recovery	Recovery	Recovery	Recovery	POC	POC	POC	POC	POC
Date Installed	n/a	Nov-93	Nov-93	Feb-94	Feb-94	Feb-94	Feb-94	Feb-94	Feb-94	Mar-94	Mar-94	Mar-94	Mar-94	Jun-94
Top of Casing	(MSL)	2440.98	2440.81	2406.25	2436.69	2440.68	2431.88	2441.48	2448.40	2440.17	2440.23	2394.79	2394.83	2475.86
Top of Pad	(MSL)	2438.31	2438.21	2402.94	2432.09	2438.49	2429.48	2438.09	2445.56	2437.25	2437.24	2391.84	2391.84	2473.41
Top of Grade	(MSL)	2438.08	2437.98	2402.71	2431.86	2438.26	2429.25	2437.86	2445.33	2437.02	2437.01	2391.61	2391.61	2473.21
TSPC Grid System	NORTHING	238,435	238,428	237,434	237,655	238,216	238,417	239,131	239,790	239,410	239,422	236,496	236,473	242,601
	EASTING	789,189	789,195	789,813	790,807	793,318	79,203	794,087	793,936	794,537	794,538	794,259	794,263	787,822
Top of Basal Gravel (Ogallala FM)	(BGL)	86.0	86.0	56.0	84.0	82.0	80.0	94.0	90.0	85.0	85.0	38.0	38.0	108.0
	(MSL)	2,352.0	2,352.0	2,346.7	2,347.9	2,356.3	2,349.3	2,343.9	2,355.3	2,352.0	2,352.0	2,353.6	2,353.6	2,365.4
	Thickness (FT)	4.0	4.0	4.0	4.0	15.0	6.0	6.0	14.0	11.0	11.0	10.0	10.0	8.0
Top of Dockum Clay (Dockum FM)	(BGL)	90.0	90.0	60.0	88.0	97.0	86.0	100.0	104.0	96.0	96.0	48.0	48.0	116.0
	(MSL)	2,348.0	2,348.0	2,342.7	2,343.9	2,341.3	2,343.3	2,337.9	2,341.3	2,341.0	2,341.0	2,343.6	2,343.6	2,357.4
Height of Riser Pipe	(feet)	2.9	2.8	3.5	4.8	2.4	2.6	3.6	3.1	3.2	3.2	3.2	3.2	2.7
Total Depth Drilled	(feet)	100.0	100.0	80.0	110.0	120.0	100.0	120.0	120.0	120.0	110.0	60.0	60.0	115.0
	(MSL)	2338.1	2338.0	2322.7	2321.9	2318.3	2329.3	2317.9	2325.3	2317.0	2327.0	2331.6	2331.6	2358.2
Borehole Diameter	(inches)	6.00	6.75	12.25	12.25	12.25	12.25	12.25	12.25	6.75	6.75	6.75	6.75	6.75
Casing Size	(inches)	2.0	2.0	6.0	6.0	6.0	6.0	6.0	6.0	2.0	2.0	2.0	2.0	2.0
Casing Material	n/a	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC
Screen Size	(inches)	2.0	2.0	6.0	6.0	6.0	6.0	6.0	6.0	2.0	2.0	2.0	2.0	2.0
Screen Material	n/a	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC
Top Screen (1)	(BGL)	68.0	70.0	31.0	60.0	62.0	57.0	66.0	70.0	59.0	85.0	27.0	38.0	78.0
	(MSL)	2370.1	2368.0	2371.7	2371.9	2376.3	2372.3	2371.9	2375.3	2378.0	2352.0	2364.6	2353.6	2395.2
Bottom Screen (1)	(BGL)	78.0	90.0	51.0	80.0	82.0	77.0	91.0	90.0	79.0	97.5	37.0	48.0	98.0
	(MSL)	2360.1	2348.0	2351.7	2351.9	2356.3	2352.3	2346.9	2355.3	2358.0	2339.5	2354.6	2343.6	2375.2
Top Screen (2)	(BGL)	na	na	56.0	85.0	87.0	82.0	96.0	95.0	na	na	na	na	na
	(MSL)	na	na	2346.7	2346.9	2351.3	2347.3	2341.9	2350.3	na	na	na	na	na
Bottom Screen (2)	(BGL)	na	na	61.0	90.0	97.0	87.0	101.0	100.0	na	na	na	na	na
	(MSL)	na	na	2341.7	2341.9	2341.3	2342.3	2336.9	2345.3	na	na	na	na	na
Screen Mill-Slot Size (1) & (2)	(inches)	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.010	0.020	0.010	0.010	0.010
Top Filter Pack	(BGL)	60.0	56.0	22.0	55.0	56.0	43.0	61.0	67.0	52.0	83.0	16.0	33.0	71.0
	(MSL)	2378.1	2382.0	2380.7	2376.9	2382.3	2386.3	2376.9	2378.3	2385.0	2354.0	2375.6	2358.6	2402.2
Filter Pack US Sieve Size	Sieves No.	10 - 16	10 - 16	10 - 16	10 - 16	10 - 16	10 - 16	10 - 16	10 - 16	10 - 16	10 - 16	10 - 16	10 - 16	10 - 16
Top Bentonite Seal	(BGL)	56.0	52.0	20.0	53.0	54.0	41.0	55.0	61.0	47.0	76.0	10.0	27.0	62.0
	(MSL)	2382.1	2386.0	2382.7	2378.9	2384.3	2388.3	2382.9	2384.3	2390.0	2361.0	2381.6	2364.6	2411.2
Compresses Bentonite Size	(inches)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Locking Steel Cover?	Yes/No	YES	YES	Recovery	Recovery	Recovery	Recovery	Recovery	Recovery	YES	YES	YES	YES	YES
Drilling & Lithologic Log?	Yes/No	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Well Construction Log?	Yes/No	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Top Casing to Well Bottom	(feet)	80.90	92.83	54.54	84.83	84.42	79.63	94.62	93.07	82.15	100.72	40.18	51.22	100.65
Sampling Method	na	Low Flow	Low Flow	Vol Purge	Vol Purge	Vol Purge	Vol Purge	Vol Purge	Vol Purge	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow
Sample Collection Depth	(BTOC)	78.90	88.83	57.00	82.00	85.00	83.00	97.10	98.00	73.15	92.22	37.18	45.22	91.65
Fluid Level in Borehole (assumed top saturation)	(feet)	69.0	69.0	39.0	65.0	70.0	60.0	68.0	79.0	60.0	60.0	28.0	28.0	79.0
	(MSL)	2369.0	2369.0	2363.7	2366.9	2368.3	2369.3	2369.9	2366.3	2377.0	2377.0	2363.6	2363.6	2394.4
	Thickness (feet)	21.0	21.0	21.0	23.0	27.0	27.0	32.0	25.0	36.0	36.0	20.0	20.0	37.0

BKGND - Background Well
POC - Point of Compliance Well
n/a - Not Applicable
MSL - feet Mean Sea Level
BGL - feet Below Grade Level

Table XI.D.3.c.(2)b-1

Summary of Existing Compliance Monitor Well Construction

Alon USA,LP Big Spring, Texas

Well ID Number	n/a	MW-152A	MW-153	MW-153A	MW-154	MW-154A	MW-155	MW-155A	MW-163	MW-163A	MW-165	MW-165A	MW-166
Program	n/a	BICA-LF	BICA-LF	BICA-LF	BICA-LF	BICA-LF	BICA-LF	BICA-LF	BICA-LF	BICA-LF	BICA-LF	BICA-LF	BICA-LF
Type of Program Well	n/a	POC	POC	POC	POC	POC	POC	POC	POC	POC	POC	POC	POC
Date Installed	n/a	Jun-94	Jun-94	Jun-94	Jun-94	Jun-94	Oct-94	Oct-94	Mar-95	Mar-95	Mar-95	Mar-95	Mar-95
Top of Casing	(MSL)	2475.86	2456.19	2456.34	2451.56	2451.58	2455.65	2455.11	2399.90	2400.56	2453.34	2453.02	2442.20
Top of Pad	(MSL)	2473.40	2453.58	2453.85	2449.10	2449.11	2452.99	2452.45	2397.28	2397.81	2450.62	2450.32	2439.49
Top of Grade	(MSL)	2473.20	2453.38	2453.65	2448.90	2448.91	2452.70	2452.20	2394.45	2397.59	2450.41	2450.12	2439.29
TSPC Grid System	NORTHING	242,601	242,418	242,415	240,331	240,341	240,882	240,881	239,104	239,414	240,725	240,706	238,922
	EASTING	787,811	786,549	786,536	787,130	787,130	795,495	795,474	787,460	787,454	797,358	797,360	798,007
Top of Basal Gravel (Ogallala FM)	(BGL)	108.0	80.0	80.0	94.0	94.0	98.0	98.0	42.0	42.0	103.0	103.0	94.0
	(MSL)	2,365.4	2,373.9	2,373.9	2,355.1	2,355.1	2,354.5	2,354.5	2,355.8	2,355.8	2,347.3	2,347.3	2,345.5
	Thickness (FT)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	6.0	6.0	5.0	5.0	1.0
Top of Dockum Clay (Dockum FM)	(BGL)	116.0	88.0	88.0	102.0	102.0	106.0	106.0	48.0	48.0	108.0	108.0	95.0
	(MSL)	2,357.4	2,365.9	2,365.9	2,347.1	2,347.1	2,346.5	2,346.5	2,349.8	2,349.8	2,342.3	2,342.3	2,344.5
Height of Riser Pipe	(feet)	2.7	2.8	2.7	2.7	2.7	3.0	2.9	5.5	3.0	2.9	2.9	2.9
Total Depth Drilled	(feet)	135.0	90.0	100.0	120.0	120.0	97.0	60.0	60.0	60.0	120.0	120.0	100.0
	(MSL)	2338.2	2363.4	2353.7	2328.9	2328.9	2355.7	2392.2	2334.5	2337.6	2330.4	2330.1	2339.3
Borehole Diameter	(inches)	6.75	6.75	6.75	6.75	6.75	6.75	6.75	6.75	6.75	6.75	6.75	6.75
Casing Size	(inches)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Casing Material	n/a	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC
Screen Size	(inches)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Screen Material	n/a	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC
Top Screen (1)	(BGL)	106.0	57.0	77.0	65.0	92.0	68.0	97.0	14.0	42.0	69.0	103.0	68.0
	(MSL)	2367.2	2396.4	2376.7	2383.9	2356.9	2384.7	2355.2	2380.5	2355.6	2381.4	2347.1	2371.3
Bottom Screen (1)	(BGL)	116.0	77.0	87.0	85.0	102.0	88.0	107.0	34.0	52.0	89.0	113.0	88.0
	(MSL)	2357.2	2376.4	2366.7	2363.9	2346.9	2364.7	2345.2	2360.5	2345.6	2361.4	2337.1	2351.3
Top Screen (2)	(BGL)	na	na	na	na	na	na	na	na	na	na	na	na
	(MSL)	na	na	na	na	na	na	na	na	na	na	na	na
Bottom Screen (2)	(BGL)	na	na	na	na	na	na	na	na	na	na	na	na
	(MSL)	na	na	na	na	na	na	na	na	na	na	na	na
Screen Mill-Slot Size (1) & (2)	(inches)	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Top Filter Pack	(BGL)	104.0	55.0	72.0	60.0	87.0	65.0	90.0	12.0	39.0	67.0	89.0	60.0
	(MSL)	2369.2	2398.4	2381.7	2388.9	2361.9	2387.7	2362.2	2382.5	2358.6	2383.4	2361.1	2379.3
Filter Pack US Sieve Size	Sieves No.	10 - 16	10 - 16	10 - 16	10 - 16	10 - 16	10 - 16	10 - 16	10 - 16	10 - 16	10 - 16	10 - 16	10 - 16
Top Bentonite Seal	(BGL)	96.0	48.0	66.0	55.0	83.0	60.0	86.0	10.0	34.0	58.0	80.0	52.0
	(MSL)	2377.2	2405.4	2387.7	2393.9	2365.9	2392.7	2366.2	2384.5	2363.6	2392.4	2370.1	2387.3
Compresses Bentonite Size	(inches)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Locking Steel Cover?	Yes/No	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Drilling & Lithologic Log?	Yes/No	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Well Construction Log?	Yes/No	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Top Casing to Well Bottom	(feet)	118.66	79.81	89.69	87.66	104.67	90.95	109.91	39.45	54.97	91.93	115.90	90.91
Sampling Method	na	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow
Sample Collection Depth	(BTOC)	113.66	70.81	85.69	74.66	99.67	80.95	104.91	29.62	47.97	82.93	106.90	80.91
Fluid Level in Borehole (assumed top saturation)	(feet)	79.0	60.0	60.0	66.0	66.0	69.0	69.0	15.0	15.0	70.0	70.0	69.0
	(MSL)	2394.4	2393.9	2393.9	2383.1	2383.1	2383.5	2383.5	2382.8	2382.8	2380.3	2380.3	2370.5
	Thickness (feet)	37.0	27.0	27.0	36.0	36.0	37.0	37.0	33.0	33.0	38.0	38.0	26.0

BKGND - Background Well
POC - Point of Compliance Well
n/a - Not Applicable
MSL - feet Mean Sea Level
BGL - feet Below Grade Level

Table XI.D.3.c.(2)b-1

Summary of Existing Compliance Monitor Well Construction

Alon USA, LP Big Spring, Texas

Well ID Number	n/a	MW-166A	RW-179	RW-192	RW-194	RW-195	MW-214	MW-214A	MW-215	MW-215A	MW-218	MW-218A	MW-220
Program	n/a	BICA-LF	BICA-VP	BICA-VP	BICA-VP	BICA-VP	BICA-LF	BICA-LF	BICA-LF	BICA-LF	BICA-LF	BICA-LF	BICA-LF
Type of Program Well	n/a	POC	Recovery	Recovery	Recovery	Recovery	POC	POC	POC	POC	POC	POC	POC
Date Installed	n/a	Mar-95	Oct-95	Oct-95	Oct-96	Oct-96	Jan-97	Feb-97	Feb-97	Jan-97	Feb-97	Jan-97	Nov-97
Top of Casing	(MSL)	2442.21	2434.75	2461.05	2441.86	2434.41	2477.46	2477.59	2483.17	2483.42	2468.14	2467.84	2492.53
Top of Pad	(MSL)	2439.52	2433.75	2460.19	2443.89	2432.42	2474.70	2474.83	2480.44	2480.69	2465.09	2465.07	2489.69
Top of Grade	(MSL)	2439.30	2433.50	2459.94	2441.50	2432.20	2474.45	2474.58	2480.19	2480.44	2464.84	2464.82	2489.46
TSPC Grid System	NORTHING	238,913	240,642	240,502	239,499	238,360	243,573	243,561	243,253	243,256	241,951	241,952	244,722
	EASTING	798,008	792,300	789,969	794,005	793,840	793,755	793,757	795,273	795,287	794,589	794,600	792,848
Top of Basal Gravel (Ogallala FM)	(BGL)	94.0	NE	NE	93.0	90.0	115.0	115.0	125.0	125.0	112.0	112.0	130.0
	(MSL)	2,345.5	NE	NE	2,348.5	2,342.2	2,359.6	2,359.6	2,355.4	2,355.4	2,352.8	2,352.8	2,363.0
	Thickness (FT)	1.0	NE	NE	13.0	3.0	5.0	5.0	3.0	3.0	4.0	4.0	5.0
Top of Dockum Clay (Dockum FM)	(BGL)	95.0	76.0	106.0	106.0	93.0	120.0	120.0	128.0	128.0	116.0	116.0	135.0
	(MSL)	2,344.5	NE	2,354.2	2,335.5	2,339.2	2,354.6	2,354.6	2,352.4	2,352.4	2,348.8	2,348.8	2,358.0
Height of Riser Pipe	(feet)	2.9	1.3	1.1	0.4	2.2	3.0	3.0	3.0	3.0	3.3	3.0	3.1
Total Depth Drilled	(feet)	100.0	80.0	110.0	120.0	100.0	120.0	130.0	115.0	130.0	105.0	130.0	115.0
	(MSL)	2339.3	2353.5	2349.9	2321.5	2332.2	2354.5	2344.6	2365.2	2350.4	2359.8	2334.8	2374.5
Borehole Diameter	(inches)	6.75	14.00	14.00	12.25	12.25	6.75	6.75	6.75	6.75	6.75	6.75	6.75
Casing Size	(inches)	2.0	8.0	8.0	6.0	6.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Casing Material	n/a	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC
Screen Size	(inches)	2.0	8.0	8.0	6.0	6.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Screen Material	n/a	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC
Top Screen (1)	(BGL)	90.0	43.0	66.0	60.5	55.0	78.0	115.0	91.0	123.0	80.0	111.0	89.0
	(MSL)	2349.3	2390.5	2393.9	2381.0	2377.2	2396.5	2359.6	2389.2	2357.4	2384.8	2353.8	2400.5
Bottom Screen (1)	(BGL)	95.0	73.0	106.0	90.5	85.0	98.0	120.0	111.0	128.0	100.0	116.0	109.0
	(MSL)	2344.3	2360.5	2353.9	2351.0	2347.2	2376.5	2354.6	2369.2	2352.4	2364.8	2348.8	2380.5
Top Screen (2)	(BGL)	na	na	na	95.5	90.0	na	na	na	na	na	na	na
	(MSL)	na	na	na	2346.0	2342.2	na	na	na	na	na	na	na
Bottom Screen (2)	(BGL)	na	na	na	105.5	95.0	na	na	na	na	na	na	na
	(MSL)	na	na	na	2336.0	2337.2	na	na	na	na	na	na	na
Screen Mill-Slot Size (1) & (2)	(inches)	0.010	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
Top Filter Pack	(BGL)	83.0	36.0	60.0	57.0	48.0	74.0	113.0	82.0	121.0	77.0	104.0	86.0
	(MSL)	2356.3	2397.5	2399.9	2384.5	2384.2	2400.5	2361.6	2398.2	2359.4	2387.8	2360.8	2403.5
Filter Pack US Sieve Size	Sieves No.	10 - 16	10 - 16	10 - 16	10 - 16	10 - 16	10 - 16	10 - 16	10 - 16	10 - 16	10 - 16	10 - 16	10 - 16
Top Bentonite Seal	(BGL)	72.0	33.0	57.0	51.5	45.0	70.5	107.0	77.0	118.5	72.0	99.0	80.0
	(MSL)	2367.3	2400.5	2402.9	2390.0	2387.2	2404.0	2367.6	2403.2	2361.9	2392.8	2365.8	2409.5
Compresses Bentonite Size	(inches)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Locking Steel Cover?	Yes/No	YES	Recovery	Recovery	Recovery	Recovery	YES	YES	YES	YES	YES	YES	YES
Drilling & Lithologic Log?	Yes/No	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Well Construction Log?	Yes/No	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Top Casing to Well Bottom	(feet)	97.91	74.25	107.11	90.86	87.21	101.01	123.01	113.98	130.98	103.30	119.02	112.07
Sampling Method	na	Low Flow	Vol Purge	Vol Purge	Vol Purge	Vol Purge	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow
Sample Collection Depth	(BTOC)	93.91	51.00	72.00	90.00	85.00	91.01	120.01	103.98	128.48	93.30	116.02	102.07
Fluid Level in Borehole (assumed top saturation)	(feet)	69.0	48.0	73.0	67.0	63.0	79.0	79.0	92.0	92.0	81.0	81.0	95.0
	(MSL)	2370.5	2385.8	2387.2	2374.5	2369.2	2395.6	2395.6	2388.4	2388.4	2383.8	2383.8	2398.0
	Thickness (feet)	26.0	*NFP*	*33.0*	39.0	30.0	41.0	41.0	36.0	36.0	35.0	35.0	40.0

BKGND - Background Well
POC - Point of Compliance Well
n/a - Not Applicable
MSL - feet Mean Sea Level
BGL - feet Below Grade Level

Table XI.D.3.c.(2)b-1

Summary of Existing Compliance Monitor Well Construction

Alon USA,LP Big Spring, Texas

Well ID Number	n/a	MW-220A	MW-221	MW-221A	MW-223	MW-223A	MW-224	MW-224A	MW-225	MW-225A	MW-227	MW-227A
Program	n/a	BICA-LF	BICA-VP	BICA-LF	BICA-LF	BICA-LF	BICA-LF	BICA-LF	BICA-LF	BICA-LF	BICA-LF	BICA-LF
Type of Program Well	n/a	POC	POC	POC	POC	POC	POC	POC	POC	POC	POC	POC
Date Installed	n/a	Oct-97	Oct-97	Oct-97	Oct-97	Oct-97	Nov-97	Oct-97	Nov-97	Nov-97	Nov-97	Oct-97
Top of Casing	(MSL)	2492.95	2512.68	2512.56	2505.30	2506.46	2521.92	2521.54	2476.92	2477.25	2486.14	2486.81
Top of Pad	(MSL)	2490.28	2509.72	2509.66	2502.40	2503.74	2519.03	2518.68	2474.36	2474.42	2483.62	2484.01
Top of Grade	(MSL)	2490.05	2509.49	2509.43	2502.17	2503.51	2518.80	2518.45	2474.13	2474.19	2483.39	2483.78
TSPC Grid System	NORTHING	244,737	245,811	245,815	246,138	246,141	246,795	246,788	243,803	243,816	245,007	245,019
	EASTING	792,839	791,199	791,215	792,440	792,456	792,343	792,357	787,715	787,712	787,569	787,560
Top of Basal Gravel (Ogallala FM)	(BGL)	130.0	147.0	147.0	139.0	139.0	150.0	150.0	105.0	105.0	117.0	117.0
	(MSL)	2,363.0	2,365.6	2,365.6	2,367.5	2,367.5	2,371.5	2,371.5	2,372.3	2,372.3	2,369.8	2,369.8
	Thickness (FT)	5.0	8.0	8.0	6.0	6.0	7.0	7.0	5.0	5.0	7.0	7.0
Top of Dockum Clay (Dockum FM)	(BGL)	135.0	155.0	155.0	145.0	145.0	157.0	157.0	110.0	110.0	124.0	124.0
	(MSL)	2,358.0	2,357.6	2,357.6	2,361.5	2,361.5	2,364.5	2,364.5	2,367.3	2,367.3	2,362.8	2,362.8
Height of Riser Pipe	(feet)	2.9	3.2	3.1	3.1	2.9	3.1	3.1	2.8	3.1	2.8	3.0
Total Depth Drilled	(feet)	140.0	130.0	160.0	120.0	150.0	140.0	160.0	100.0	100.0	110.0	128.0
	(MSL)	2350.1	2379.5	2349.4	2382.2	2353.5	2378.8	2358.5	2374.1	2374.2	2373.4	2355.8
Borehole Diameter	(inches)	6.75	6.75	6.75	6.75	6.75	6.75	6.75	6.75	6.75	6.75	6.75
Casing Size	(inches)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Casing Material	n/a	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC
Screen Size	(inches)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Screen Material	n/a	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC
Top Screen (1)	(BGL)	130.0	103.0	150.0	98.0	140.0	111.0	152.0	77.0	105.0	79.0	119.0
	(MSL)	2360.1	2406.5	2359.4	2404.2	2363.5	2407.8	2366.5	2397.1	2369.2	2404.4	2364.8
Bottom Screen (1)	(BGL)	135.0	123.0	155.0	118.0	145.0	131.0	157.0	97.0	110.0	99.0	124.0
	(MSL)	2355.1	2386.5	2354.4	2384.2	2358.5	2387.8	2361.5	2377.1	2364.2	2384.4	2359.8
Top Screen (2)	(BGL)	na	na	na	na	na	na	na	na	na	na	na
	(MSL)	na	na	na	na	na	na	na	na	na	na	na
Bottom Screen (2)	(BGL)	na	na	na	na	na	na	na	na	na	na	na
	(MSL)	na	na	na	na	na	na	na	na	na	na	na
Screen Mill-Slot Size (1) & (2)	(inches)	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
Top Filter Pack	(BGL)	127.0	100.0	146.0	94.0	135.0	106.0	147.5	73.0	102.0	77.0	115.5
	(MSL)	2363.1	2409.5	2363.4	2408.2	2368.5	2412.8	2371.0	2401.1	2372.2	2406.4	2368.3
Filter Pack US Sieve Size	Sieves No.	10 - 16	10 - 16	10 - 16	10 - 16	10 - 16	10 - 16	10 - 16	10 - 16	10 - 16	10 - 16	10 - 16
Top Bentonite Seal	(BGL)	122.0	95.0	136.0	85.0	131.0	101.0	143.0	67.0	96.0	72.0	112.5
	(MSL)	2368.1	2414.5	2373.4	2417.2	2372.5	2417.8	2375.5	2407.1	2378.2	2411.4	2371.3
Compresses Bentonite Size	(inches)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Locking Steel Cover?	Yes/No	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Drilling & Lithologic Log?	Yes/No	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Well Construction Log?	Yes/No	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Top Casing to Well Bottom	(feet)	137.90	126.19	158.13	121.13	147.95	134.12	160.09	99.79	113.06	101.75	127.03
Sampling Method	na	Low Flow	Vol Purge	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow
Sample Collection Depth	(BTOC)	134.90	-----	154.13	111.13	144.95	124.12	157.09	89.79	110.06	91.75	124.03
Fluid Level in Borehole (assumed top saturation)	(feet)	95.0	115.0	115.0	101.0	101.0	120.0	120.0	78.0	78.0	83.0	83.0
	(MSL)	2398.0	2397.6	2397.6	2405.5	2405.5	2401.5	2401.5	2399.3	2399.3	2403.8	2403.8
	Thickness (feet)	40.0	40.0	40.0	44.0	44.0	37.0	37.0	32.0	32.0	41.0	41.0

BKGND - Background Well
POC - Point of Compliance Well
n/a - Not Applicable
MSL - feet Mean Sea Level
BGL - feet Below Grade Level

Table XI.D.3.c.(2)b-2

Material Specifications

Alon USA, LP Big Spring Refinery - Big Spring, Texas

ITEM	MATERIALS
Pilot Hole	4-inch diameter
Reem Hole	10-inch minimum diameter
Surface Sleeve	8-inch by 5-feet steel casing
Well Casing	2-inch ID PVC, Sch 40, Flush-threaded
Well Screen	2-inch ID PVC, Sch 40, Flush-threaded, 0.01 or 0.02 mill-slotted
Well Cap	2-inch PVC female-slip cap
Well Plug	2-inch PVC male-threaded sand point
Filter Pack (1)	10:16 presieved & washed silica sand
Filter Pack Seal	0.5-inch pure bentonite compressed pellets
Annulus Seal (2)	Cement / Bentonite Grout mixture
Surface Seal	6-feet by 6-feet by 6-inch Concrete Pad with mesh
Centralizer	2-inch:8-inch Stainless Steel expansion
Protective Casing	5-feet by 4-inch Locking Steel Stand-Pipe

(1) Acceptable Sieve Range

US Standard Sieve #	Size (inches)	Grain Size
170 60	0.0035 0.0098	Fine Sand
50 30	0.0117 0.0232	Medium Sand
25 18	0.028 0.0394	Coarse Sand
16 **10**	**0.0469** **0.0787**	**Very Coarse Sand**
8 6	0.0931 0.132	Very Fine Gravel

(2) Grout Mixture Cement and Bentonite Gel Powder to be mixed by a ratio of (by volume weight) 95% Type I-II Portland Cement to 5% Bentonite gel mixed in sufficient water volume to create a 12 to 13 pound per gallon grout as determined by a standard mud-weight scale

FIGURES

- Figure XI.D.3.c(2)b-1 Map Loc of Existing Monitor Wells
- Figure XI.D.3.c(2)b-2 General Schematic of Cluster Completion Well Set

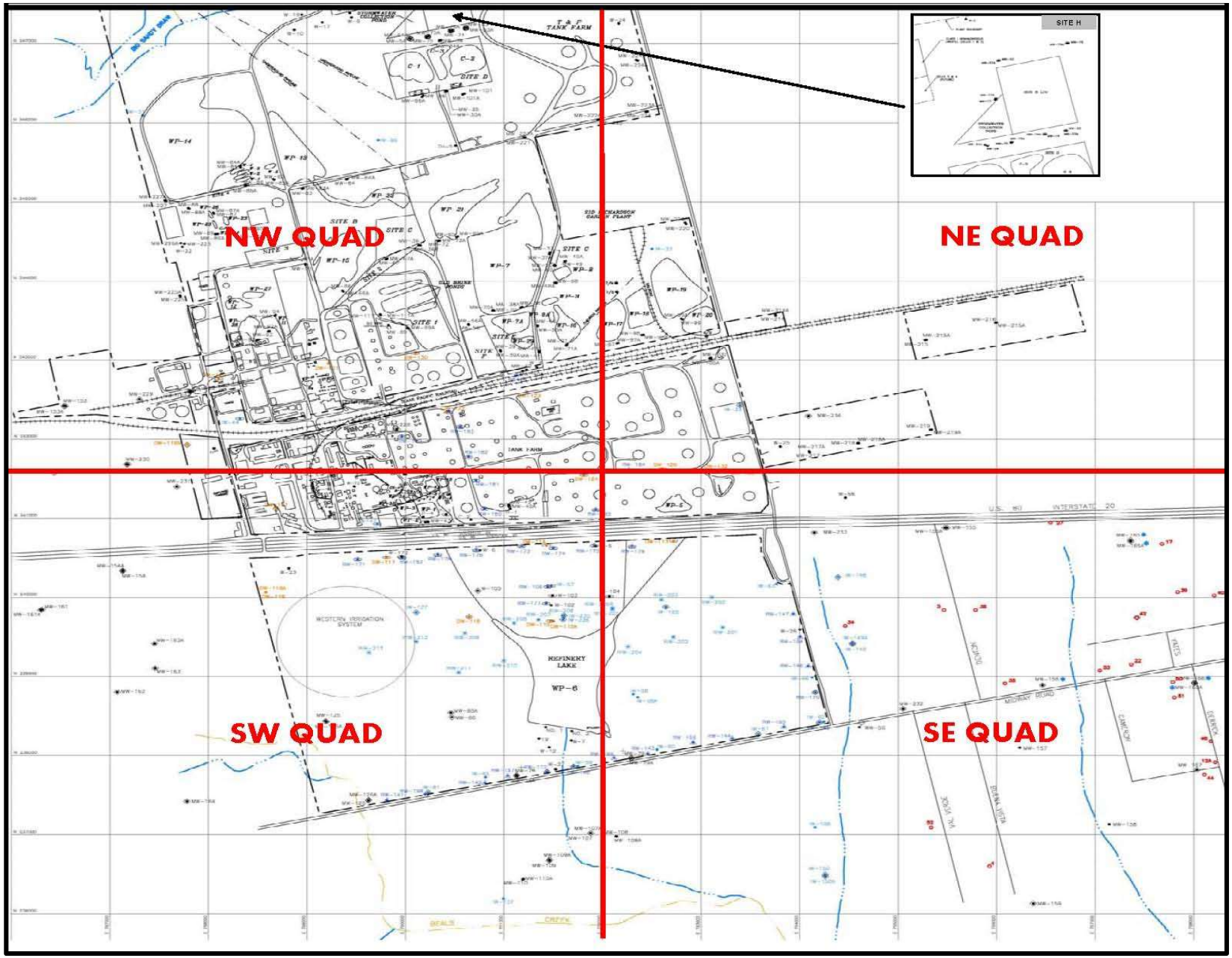


Figure No.	Sheet No.	Map Quad:	Figure Title
XI.D.3.c.(2)b-1	1 of 5	BASE	Map Locations of Existing Monitoring Wells (Base)
Facility: Big Spring Refinery	Owner: Alon USA LP		

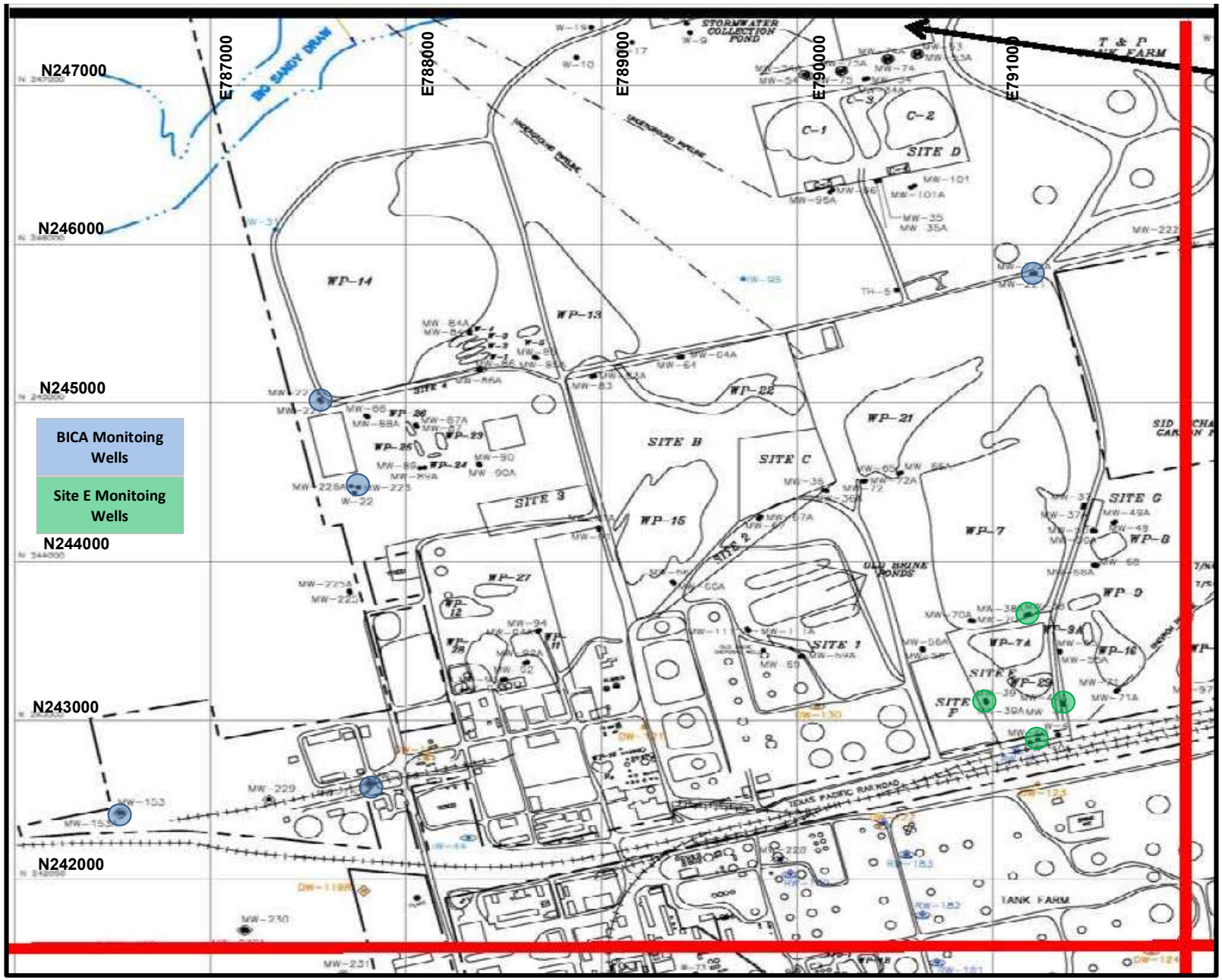


Figure No.	Sheet No.	Map Quad:	Figure Title
XI.D.3.c.(2)b-1	2 of 5	NW	Map Locations of Existing Monitoring Wells (Northwest Quad.)
Facility: Big Spring Refinery		Owner: Alon USA LP	

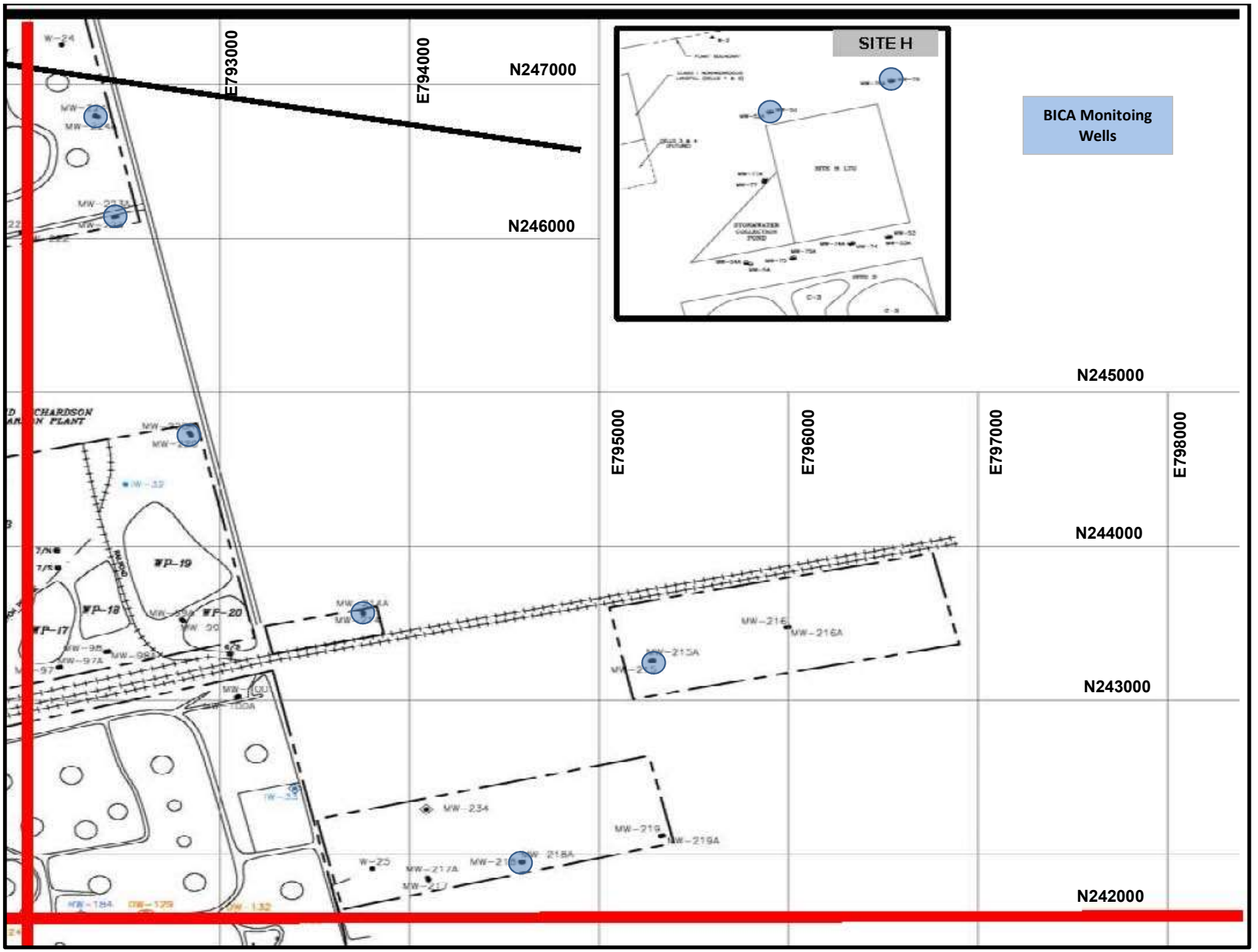


Figure No.	Sheet No.	Map Quad:
XI.D.3.c.(2)b-1	3 of 5	NW
Facility	**Owner**	
Big Spring Refinery	Alon USA LP	

Figure Title

Map Locations of Existing Monitoring Wells (Northeast Quad.)

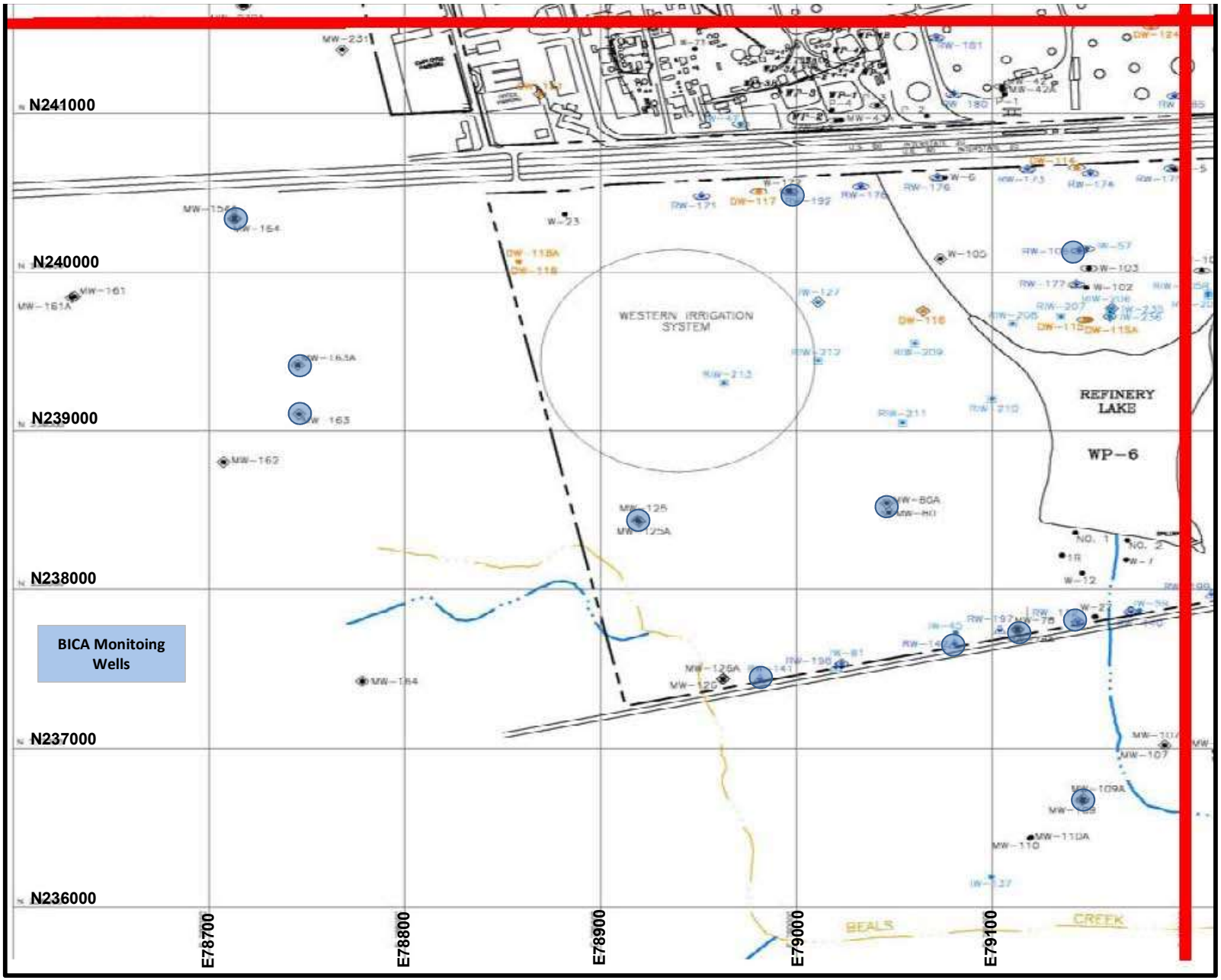


Figure No.	Sheet No.	Map Quad:
XI.D.3.c.(2)b-1	4 of 5	NW
Facility	**Owner**	
Big Spring Refinery	Alon USA LP	

Figure Title

Map Locations of Existing Monitoring Wells (Southwest Quad.)

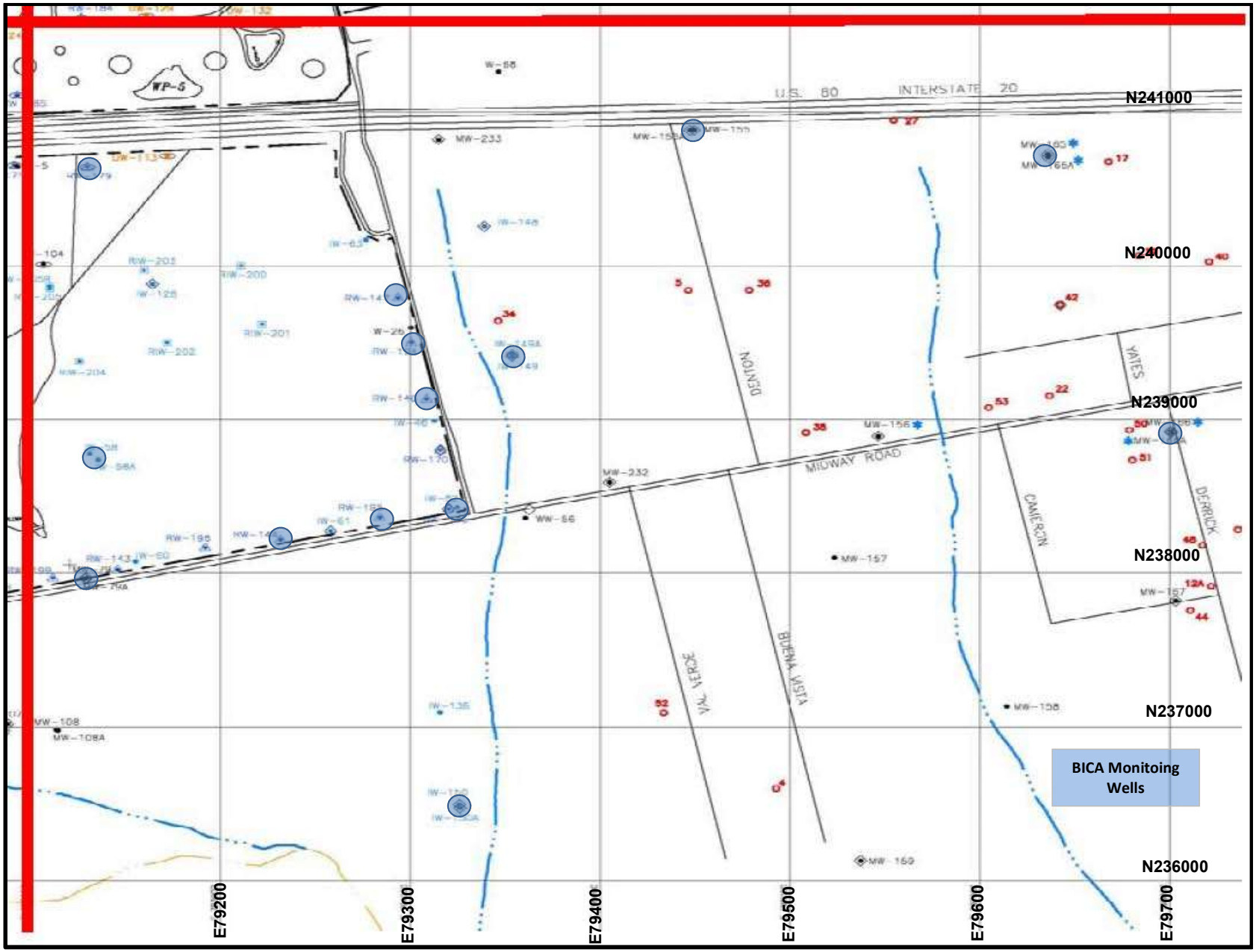


Figure No.	Sheet No.	Map Quad:
XI.D.3.c.(2)b-1	5 of 5	NW

Facility	Owner
Big Spring Refinery	Alon USA LP

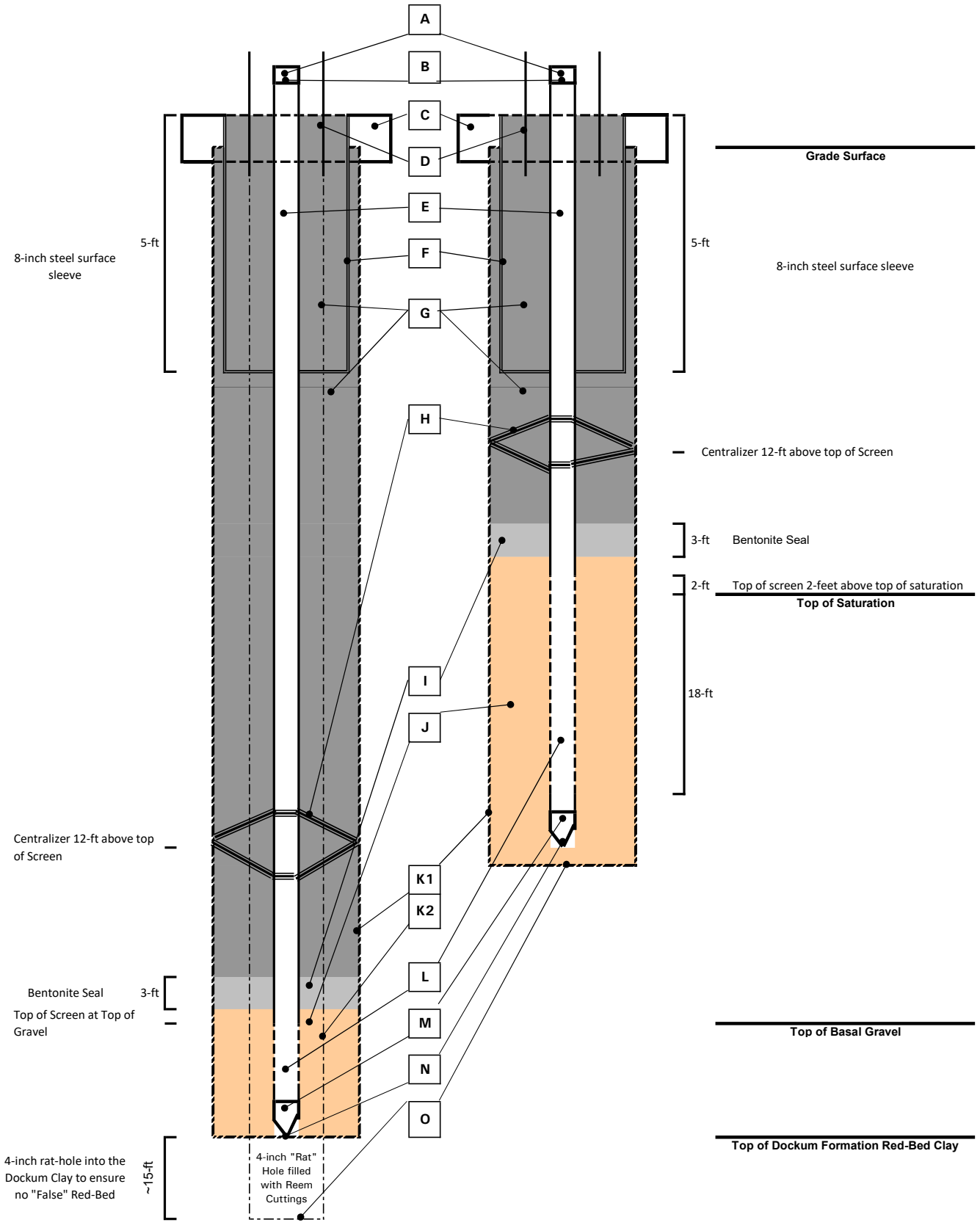
Figure Title

Map Locations of Existing Monitoring Wells (Southeast Quad.)

Figure XI.D.3.c.(2)b-2

GENERAL SCHEMATIC OF CLUSTER COMPLETION WELL SET

Alon USA - Big Spring Refinery



A 2-inch PVC Slip Cap
B Top of Well Casing
C 6-inch x 6-inch x 6-feet Reinforced Concrete Surface Pad
D 4-inch x 4-inch x 5-feet slip-over locking steel cover standpipe
E 2-inch PVC, Flush-Threaded Tri-Lock or equivalent
F 8-inch x 5-ft steel surface casing set 4-ft below grade
G 12 to 13 lbs/gallon mix, Portland Type I-II with 5% bentonite
H 4-inch x 8-inch expansion, stainless steel centralizer
I 1/2-inch (minimum) compressed pure bentonite pellets/chips
J 10:16 pre-sieved & washed silica sand
K1 8-inch final reem hole
K2 4-inch pilot hole
L 2-inch, Schedule 40 PVC with 0.020 milled slots
M 2-inch PVC , male-treaded sandpoint plug
N Total Well Depth
O Total Borehole Depth

ATTACHMENT XI.D.3.C(2)B-A
MONITOR WELL CONSTRUCTION LOGS – SITE E

Monitor Well Installation

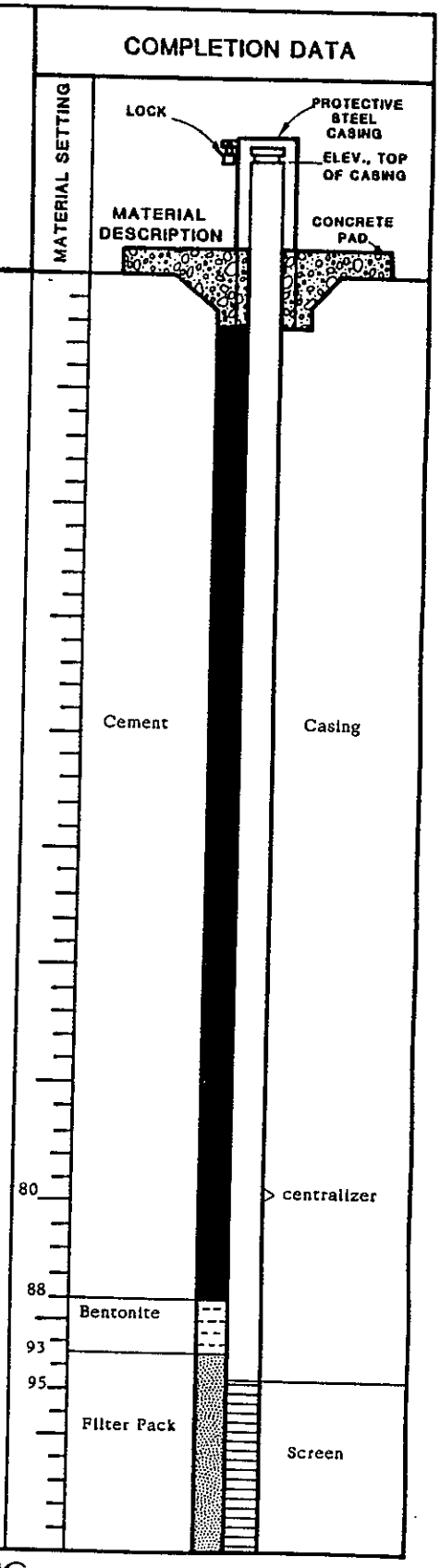
CLIENT: Fina Oil and Chemical Company JOB NO.: 119505 DATE DRILLED: 9-17-87 WELL NO.: MW-38

SITE: Big Spring, Texas ELEVATION: PAD 2497.45 TOP OF PVC CASING 2500.28

TOTAL DEPTH: 117.7' TOC CASING SIZE & TYPE: 2" PVC Flush Threaded SCREEN SIZE: 0.020 mill slot

WATER LEVEL: 100.21' REF.: TOC DATE: 10-1-87 TIME: 1417 Hrs. GEOLOGIST: Robert Sherrill

DEPTH	N. VALUE (BLOW/FT)	POCKET PENETROMETER (TONS/FT²)	SYMBOL	STRATIGRAPHY	SAMPLE DESCRIPTION
			SP		SAND - uniform fine grain, loose, grey, damp
10			SP		SAND - similar to above
20			SP		SAND - uniform fine grain, loose, red, dry
30			SP		SAND - similar to above except some minor gravel, calcareous
40			SP		SAND - similar to above except no gravel
50			SP		SAND - similar to above except 2% fine calcareous gravel
60			SP		SAND - similar to above
70			SP		SAND - similar to above
80			SP		SAND - similar to above except no gravel
90			SP		SAND - similar to above
					Top of saturation 96' below grade
100			SP		SAND - similar to above except saturated



JONES AND NEUSE, INC.
Engineering and Environmental Consultants

Monitor Well Installation

CLIENT: Fina Oil and Chemical Company JOB NO.: 119505 DATE DRILLED: 9-17-87 WELL NO.: MW-38

SITE: Big Spring, Texas ELEVATION: PAD 2497.45 TOP OF PVC CASING 2500.28

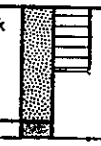
TOTAL DEPTH: 117.7' TOC CASING SIZE & TYPE: 2" PVC Flush Threaded SCREEN SIZE: 0.020 mill slot

WATER LEVEL: 100.21' REF.: TOC DATE: 10/1/87 TIME: 1417 hours GEOLOGIST: Robert Sherrill

DEPTH	N. VALUE (BLOW/FT)	POCKET PENETROMETER (TONS/FT²)	SYMBOL	STRATIGRAPHY	SAMPLE DESCRIPTION
			GP		SANDY GRAVEL - fine to very fine calcareous and chert gravel, subrounded,30% fine sand,loose,grey,saturated
120			GP		SANDY GRAVEL - similar to above except 45% sand
					Boring Terminated at 120' feet below grade

COMPLETION DATA

MATERIAL SETTING	MATERIAL DESCRIPTION CONT'D.
115	Filter Pack
119	Screen
120	Collapse



JONES AND NEUSE, INC. CONSULTING ENGINEERS' AUSTIN, TEXAS

Monitor Well Installation

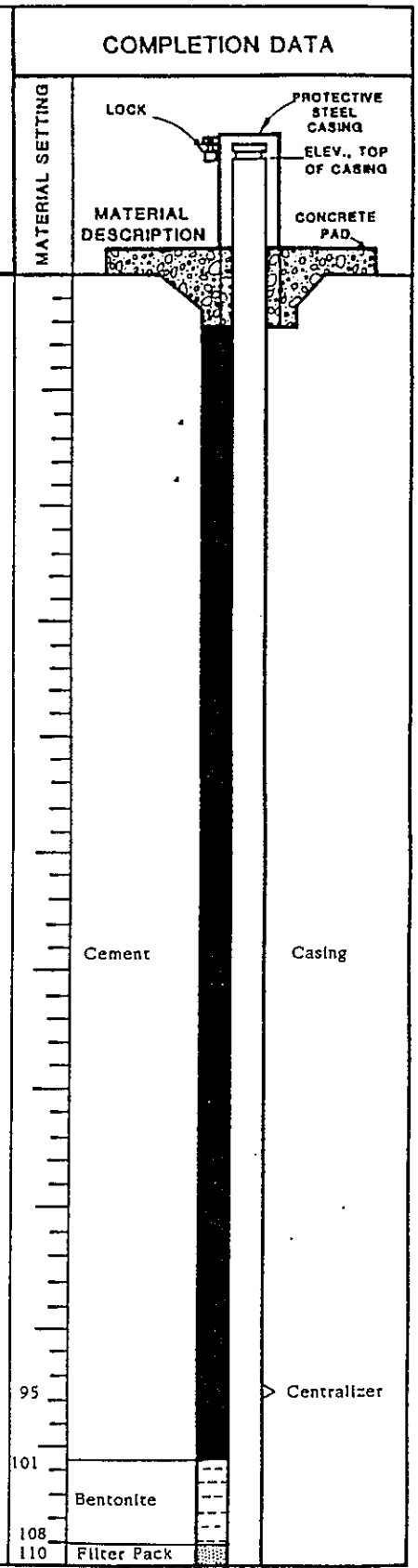
CLIENT: Fina Oil and Chemical Company JOB NO.: 119505 DATE DRILLED: 9-16-87 WELL NO.: MW-38A

SITE: Big Spring, Texas ELEVATION: PAD 2497.58 TOP OF PVC CASING 2500.25

TOTAL DEPTH: 147.77' TOC CASING SIZE & TYPE: 2" PVC Flush Threaded SCREEN SIZE: 0.020 mill slot

WATER LEVEL: 100.29' REF.: TOC DATE: 10-1-87 TIME: 1421 hrs. GEOLOGIST: Robert Sherrill

DEPTH	N. VALUE (BLOW/FT)	POCKET PENETROMETER (TONS/FT²)	SYMBOL	STRATIGRAPHY	SAMPLE DESCRIPTION
			SP		SAND - uniform fine grain, loose, black, saturated.
10			SP		SAND - similar to above
20			SP		SAND - uniform fine grain, loose, grey, damp
30			SP		SAND - similar to above except red, some minor calcareous gravel, dry
40			SP		SAND - uniform fine, loose, red, dry
50			SP		SAND - similar to above except 2% fine calcareous gravel
60			SP		SAND - similar to above
70			SP		SAND - similar to above
80			SP		SAND - similar to above except no gravel
90			SP		SAND - similar to above
			▼		Top of saturation 96' feet below grade
100			SP		SAND - similar to above except saturated



JONES AND NEUSE, INC.
Engineering and Environmental

Monitor Well Installation

CLIENT: Fina Oil and Chemical Company JOB NO.: 119505 DATE DRILLED: 3-16-87 WELL NO.: MW-38A

SITE: Big Spring, Texas ELEVATION: PAD 2497.58 TOP OF PVC CASING 2500.25

TOTAL DEPTH: 147.77' TOC CASING SIZE & TYPE: 2" ID PVC Flush Threaded SCREEN SIZE: 0.020 mill slot

WATER LEVEL: 100.29 REF.: TOC DATE: 10/1/87 TIME: 1421 hrs. GEOLOGIST: Robert L. Sherrill

DEPTH	N. VALUE (BLOW/FT)	POCKET PENETROMETER (TONS/FT²)	SYMBOL	STRATIGRAPHY	SAMPLE DESCRIPTION
120			GP		SANDY GRAVEL - fine to very fine calcareous and chert gravel, subrounded, 30% fine sand, loose, grey, saturated
			GP		SANDY GRAVEL - similar to above except 45% sand
130			GP		SANDY GRAVEL - similar to above except 10% sand
140			GP		SANDY GRAVEL - similar to above
					Ogallala FM / Dockum Group
150			CH		CLAY - highly plastic, dense, red, dry
160			CH		CLAY - similar to above
					Boring Terminated at 160' feet below grade

COMPLETION DATA

MATERIAL SETTING	MATERIAL DESCRIPTION CONT'D.
145	Filter Pack
146	Collapse
160	

Screen

JONES AND NEUSE, INC. CONSULTING ENGINEERS AUSTIN, TEXAS

Monitor Well Installation

CLIENT: Fina Oil and Chemical Company JOB NO.: 119505 DATE DRILLED: 9-23-87 WELL NO.: MW-39

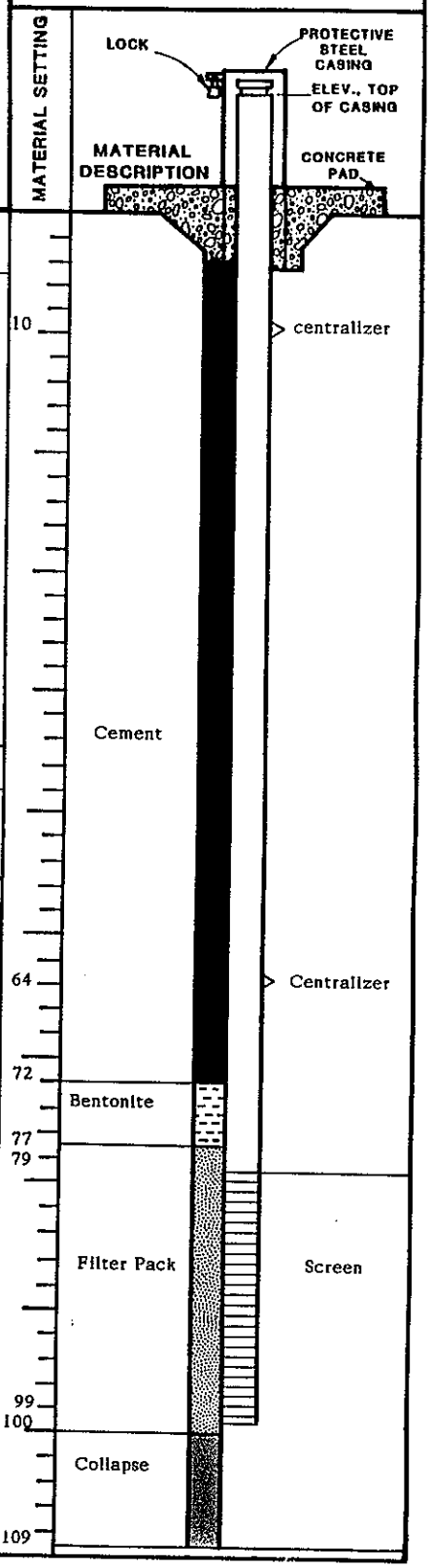
SITE: Big Spring, Texas ELEVATION: PAD 2482.59 TOP OF PVC CASING 2485.47

TOTAL DEPTH: 102.18' TOC CASING SIZE & TYPE: 2" PVC Flush Threaded SCREEN SIZE: 0.020 mill slot

WATER LEVEL: 87.32 REF.: TOC DATE: 10-1-87 TIME: 1430 hrs. GEOLOGIST: Robert L. Sherrill

DEPTH	N. VALUE (BLOW/FT)	POCKET PENETROMETER (TONS/FT²)	SYMBOL	STRATIGRAPHY	SAMPLE DESCRIPTION
					Asphalt
			F		Fill Material - SAND - uniform fine, loose, red, damp
10			SP		SAND - uniform fine grain, loose, red and grey, damp
20			SP		SAND - uniform fine grain, loose, red, dry, some minor very fine calcareous gravel
30			SP		SAND - uniform fine grain, loose, red, dry
40			SP		SAND - similar to above except some minor calcareous cement
			SS		SANDSTONE - uniform fine grain, dense, 40% calcareous cement, red, dry
50			SP		SAND - uniform fine grain, loose, red, dry
			SS		SANDSTONE - uniform fine grain, dense, 40% calcareous cement, red dry
60			SP		SAND - uniform fine grain, loose, red, dry
70			SP		SAND - similar to above
80			SP		▼ Top of Saturation 80 feet below grade SAND - uniform fine grain, <5% fine to medium calcareous and chert gravel, loose, red, saturated
90			SP		GRAVELLY SAND - uniform fine sand, 10% fine subrounded calcareous and chert gravel, loose, red, saturated
100			GP		GRAVEL - fine to medium chert and calcareous gravel, <5% fine sand, loose, red and grey, saturated
					BORING TERMINATED AT 109.0' BELOW GRADE

COMPLETION DATA



JONES AND NEUSE, INC.
Engineering and Environmental Consultants

Monitor Well Installation

CLIENT: Fina Oil and Chemical Company JOB NO.: 119505 DATE DRILLED: 9/22/87 WELL NO.: MW-39A

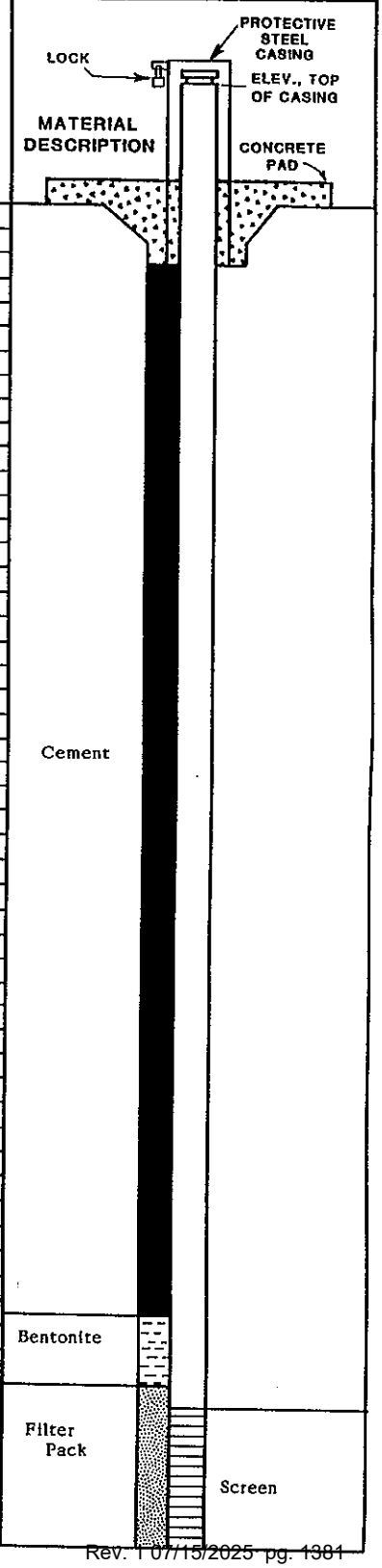
SITE: Big Spring, Texas ELEVATION: PAD 2482.88 TOP OF PVC CASING 2485.63

TOTAL DEPTH: 133.08' TOC CASING SIZE & TYPE: 2" ID PVC Flush Threaded SCREEN SIZE: 0.020 mill slot

WATER LEVEL: 87.50' REF.: TOC DATE: 10-1-87 TIME: 1434 hrs. GEOLOGIST: Robert L. Sherrill

DEPTH	N. VALUE (BLOW/FT)	POCKET PENETROMETER (TONS/FT²)	SYMBOL	STRATIGRAPHY	SAMPLE DESCRIPTION
			F		Asphalt FILL MATERIAL - SAND - uniform fine, loose, red, damp
10			SP		SAND - uniform fine grain, loose, red and grey, damp
20			SP		SAND - uniform fine grain, loose, red, dry, some minor very fine calcareous gravel
30			SP		SAND - uniform fine grain, loose, red, dry
40			SP		SAND - similar to above except some minor calcareous cement
			SS		SANDSTONE - uniform fine grain, dense, 40% calcareous cement, red, dry
50			SP		SAND - uniform fine grain, loose, red, dry
			SS		SANDSTONE - uniform fine grain, dense, 40% calcareous cement, red, dry
60			SP		SAND - uniform fine grain, loose, red, dry
70			SP		SAND - uniform fine grain, loose, red, dry
					Top of Saturation 80.0' below grade
80			SP		SAND - uniform fine grain, <5% fine to medium calcareous and chert gravel, loose, red, saturated
90			SP		GRAVELLY SAND - uniform fine sand, 10% fine subrounded calcareous and chert gravel, loose, red, saturated
100			GP		GRAVEL - fine to medium chert and clacareous gravel, <5% fine sand, loose, red and grey, saturated

COMPLETION DATA



JONES AND NEUSE, INC. CONSULTING ENGINEERS AUSTIN, TEXAS

Monitor Well Installation

CLIENT: Fina Oil and Chemical Company JOB NO.: 119505 DATE DRILLED: 9-22-87 WELL NO.: MW-39A

SITE: Big Spring, Texas ELEVATION: PAD 2482.88 TOP OF PVC CASING 2485.63

TOTAL DEPTH: 133.08' TOC CASING SIZE & TYPE: 2" ID PVC Flush Threaded SCREEN SIZE: 0.020 mill slot

WATER LEVEL: 87.50 REF.: TOC DATE: 10/1/87 TIME: 1434 Hrs. GEOLOGIST: Robert L. Sherrill

DEPTH	N. VALUE (BLOW/FT)	POCKET PENETROMETER (TONS/FT²)	SYMBOL	STRATIGRAPHY	SAMPLE DESCRIPTION
120			GP		SANDY GRAVEL - similar to above except 15% fine sand
			GP		SANDY GRAVEL - similar to above
130			CH		CLAY - highly plastic, hard, dry, red — Ogallala FM / Dockum Group
140			CH		CLAY - similar to above
					Boring Terminated at 140 feet below grade

COMPLETION DATA

MATERIAL SETTING	MATERIAL DESCRIPTION CONT'D.
130	Filter Pack
132	Collapse
140	

JONES AND NEUSE, INC. CONSULTING ENGINEERS AUSTIN, TEXAS

Monitor Well Installation

CLIENT: Fina Oil and Chemical Company JOB NO.: 119505 DATE DRILLED: 9-10-87 WELL NO.: MW-40

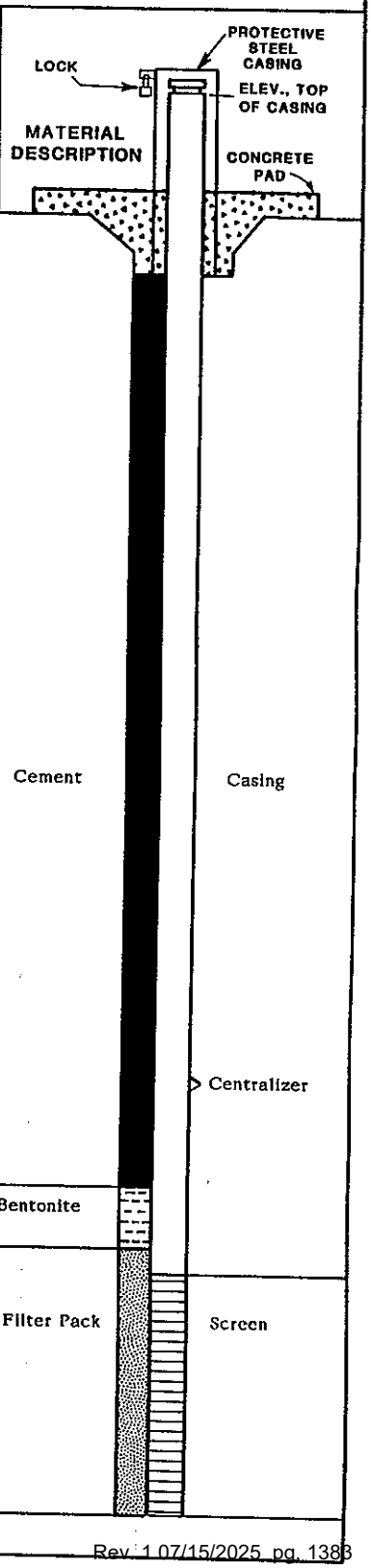
SITE: Big Spring, Texas ELEVATION: PAD 2477.28 TOP OF PVC CASING 2480.01

TOTAL DEPTH: 109.89' TOC CASING SIZE & TYPE: 2" Sch 40 PVC FLUSH THREADED SCREEN SIZE: 0.020 mill slot

WATER LEVEL: 83.55' REF.: TOC DATE: 10-1-87 TIME: 1450 hrs. GEOLOGIST: Robert L. Sherrill

DEPTH	N. VALUE (BLOW/FT)	POCKET PENETROMETER (TONS/FT²)	SYMBOL	STRATIGRAPHY	SAMPLE DESCRIPTION
10			SM		SILTY SAND - uniform medium sand, 10% silt, compact, red, dry
20			SP		SAND - uniform fine, loose, red, dry
30			SP		SAND - similar to above
40			SP		SAND - similar to above
50			SP		SAND - uniform fine, dense, 15% calcareous cement, light, red, dry
60			SP		SAND - similar to above
70			SP		SAND - similar to above
80			SP		SAND - similar to above except very dense
90			SP		Top of Saturation 88.0' below grade — SAND - uniform fine, loose, red, saturated, <5% very fine caliche gravel
100			SP		SAND - uniform fine, loose, red, saturated
					BORING TERMINATED AT 107 FEET BELOW GRADE

COMPLETION DATA



JONES AND NEUSE, INC. CONSULTING ENGINEERS AUSTIN, TEXAS

Monitor Well Installation

CLIENT: Fina Oil and Chemical Company JOB NO.: 119505 DATE DRILLED: 9/8/87 WELL NO.: MW-40A

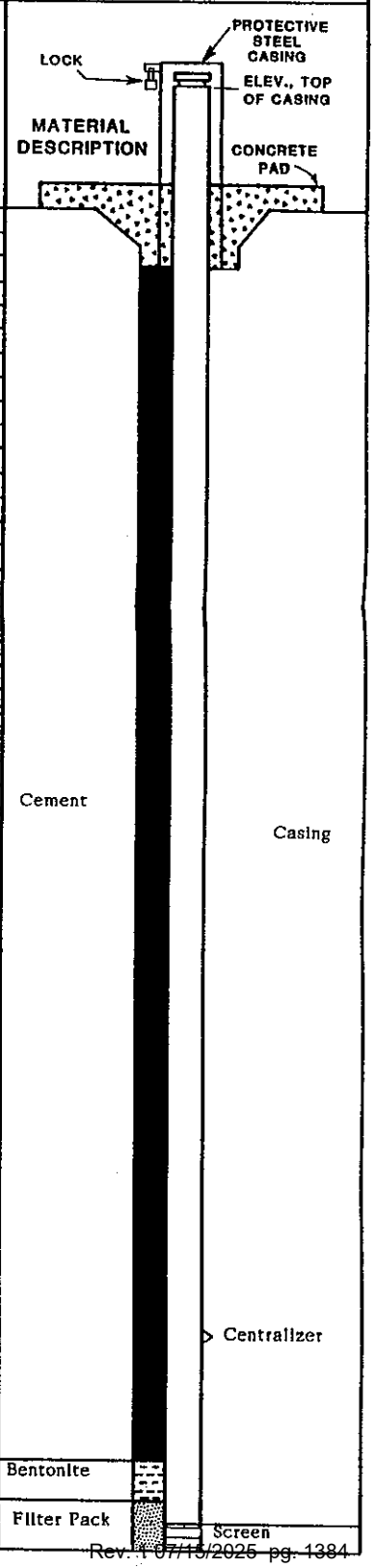
SITE: Big Spring, Texas ELEVATION: PAD 2477.32 TOP OF PVC CASING 2479.42

TOTAL DEPTH: 130.13' TOC CASING SIZE & TYPE: 2" Sch 40 PVC FLUSH THREADED SCREEN SIZE: 0.020 mill slot

WATER LEVEL: 83.64' REF.: TOC DATE: 10-1-87 TIME: 1454 hrs. GEOLOGIST: Robert Sherrill

DEPTH	N. VALUE (BLOW/FT)	POCKET PENETROMETER (TONS/FT²)	SYMBOL	STRATIGRAPHY	SAMPLE DESCRIPTION
10			SM		SILTY SAND - uniform medium sand, 10% silt, compact, red, dry
20			SP		SAND - uniform fine, loose, red, dry
30			SP		SAND - similar to above
40			SP		SAND - similar to above
50			SP		SAND - uniform fine, dense, 15% calcareous cement, light red, dry
60			SP		SAND - similar to above
70			SP		SAND - similar to above
80			SP		SAND - similar to above
					▼ Top of Saturation 88.0' BELOW GRADE
90			SP		SAND - uniform fine, loose, red, saturated, <5% very fine caliche gravel
100			SP		SAND - uniform fine, loose, red, saturated
			GP		SANDY GRAVEL

COMPLETION DATA



JONES AND NEUSE, INC. CONSULTING ENGINEERS' AUSTIN, TEXAS

Monitor Well Installation

CLIENT: Fina Oil and Chemical Company JOB NO.: 119505 DATE DRILLED: 9-8-87 WELL NO.: MW-40A

SITE: Big Spring, Texas ELEVATION: PAD 2477.32 TOP OF PVC CASING 2479.42

TOTAL DEPTH: 130.13' TOC CASING SIZE & TYPE: 2" Sch 40 PVC FLUSH THREADED SCREEN SIZE: 0.020 mill slot

WATER LEVEL: 83.64' REF.: TOC DATE: 10-1-87 TIME: 1454 hrs. GEOLOGIST: Robert L. Sherrill

DEPTH	N. VALUE (BLOW/FT)	POCKET PENETROMETER (TONS/FT²)	SYMBOL	STRATIGRAPHY	SAMPLE DESCRIPTION
			GP		SANDY GRAVEL - uniform fine chert and calcareous gravel, loose, red, saturated
120			GP		SANDY GRAVEL - similar to above
			CH		CLAY - highly plastic, hard, red, damp — Ogallala FM / Dockum Group
130					Boring Terminated at 130 feet below grade

COMPLETION DATA

MATERIAL SETTING

MATERIAL DESCRIPTION CONT'D.

128

130

Filter Sand

Screen

Monitor Well Installation

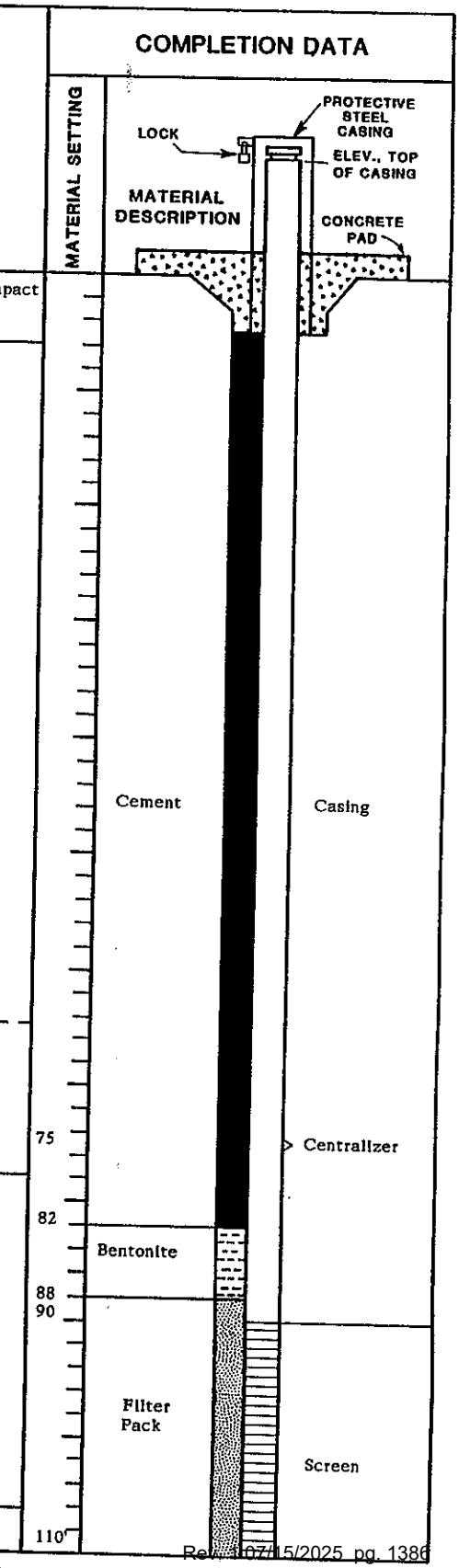
CLIENT: Fina Oil and Chemical Company JOB NO.: 119505 DATE DRILLED: 9-13-87 WELL NO.: MW-41

SITE: Big Spring, Texas ELEVATION: PAD 2486.59 TOP OF PVC CASING 2489.34

TOTAL DEPTH: 113.30' TOC CASING SIZE & TYPE: 2" ID PVC Flush Threaded SCREEN SIZE: 0.020 mill slot

WATER LEVEL: 91.80' REF.: TOC DATE: 10-1-87 TIME: 1510 Hours GEOLOGIST: Robert L. Sherrill

DEPTH	N. VALUE (BLOW/FT)	POCKET PENETROMETER (TONS/FT²)	SYMBOL	STRATIGRAPHY	SAMPLE DESCRIPTION
			SM		SILTY SAND - uniform fine grained, 15% highly plastic fines, compact grey, damp
10			SP		SAND - uniform fine grained, loose, red, dry
20			SP		SAND - similar to above
30			SP		SAND - similar to above
40			SP		SAND - similar to above
50			SP		SAND - similar to above
60			SP		SAND - similar to above
70			SP		SAND - uniform fine grain, dense, 15% calcareous cement, red, dry
80			SP		SAND - uniform fine grain, loose, red, moist
90			SP		SAND - similar to above ▼ Top of Saturation at 91.0' below grade
100			SP		SAND - similar to above except with minor calcareous fine gravel
			GP		SANDY GRAVEL - fine calcareous and chert gravel, 45% fine sand, loose, red



JONES AND NEUSE, INC. CONSULTING ENGINEERS AUSTIN, TEXAS

Monitor Well Installation

CLIENT: Fina Oil and Chemical Company JOB NO.: 119505 DATE DRILLED: 9-13-87 WELL NO.: MW-41

SITE: Big Spring, Texas ELEVATION: PAD 2486.59 TOP OF PVC CASING 2489.34

TOTAL DEPTH: 113.30' TOC CASING SIZE & TYPE: 2" ID PVC Flush Threaded SCREEN SIZE: 0.020 mill slot

WATER LEVEL: 91.80' REF.: TOC DATE: 10-1-87 TIME: 1510 hrs GEOLOGIST: Robert L. Sherrill

DEPTH	N. VALUE (BLOW/FT)	POCKET PENETROMETER (TONS/FT²)	SYMBOL	STRATIGRAPHY	SAMPLE DESCRIPTION	COMPLETION DATA: MATERIAL SETTING	COMPLETION DATA: MATERIAL DESCRIPTION CONT'D.
			GP		SANDY GRAVEL - similar to above	113	
					Boring Terminated at 113' below grade		
120							
130							
140							
150							
160							
170							
180							
190							
200							
210							

JONES AND NEUSE, INC. CONSULTING ENGINEERS AUSTIN, TEXAS

Monitor Well Installation

CLIENT: Fina Oil and Chemical Co. JOB NO.: 119505 DATE DRILLED: 9-12-87 WELL NO.: MW-41A

SITE: Big Spring, Texas ELEVATION: PAD 2487.05 TOP OF PVC CASING 2489.88

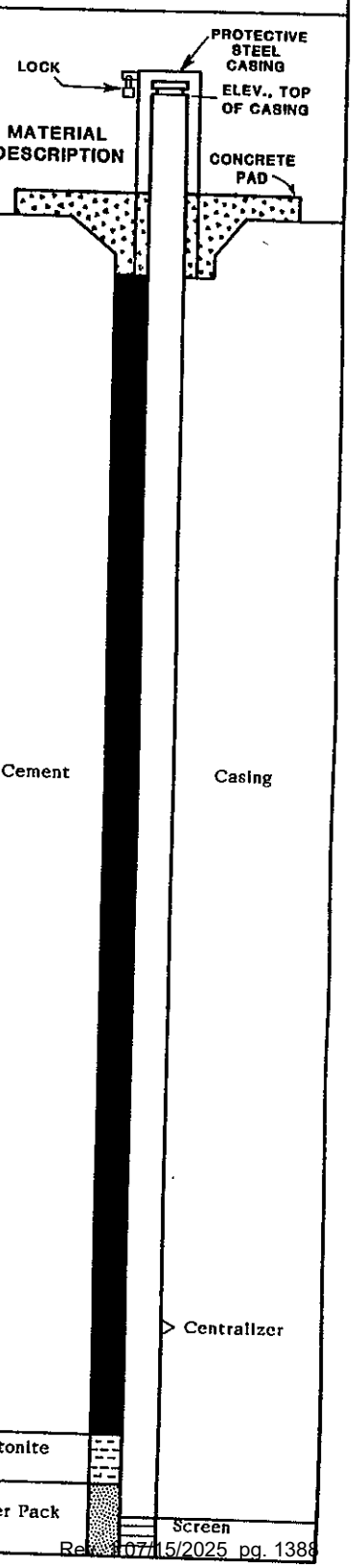
TOTAL DEPTH: 132.72' CASING SIZE & TYPE: 2" ID PVC Flush Threaded SCREEN SIZE: 0.020 mill slot

WATER LEVEL: 92.31' REF.: TOC DATE: 10-1-87 TIME: 1514 hrs. GEOLOGIST: Robert L. Sherrill

DEPTH	N. VALUE (BLOW/FT)	POCKET PENETROMETER (TONS/FT²)	SYMBOL	STRATIGRAPHY	SAMPLE DESCRIPTION
			SM		SILTY SAND - uniform fine grained, 15% highly plastic fines, compact grey, damp
10			SP		SAND - uniform fine grained, loose, red, dry
20			SP		SAND - similar to above
30			SP		SAND - similar to above
40			SP		SAND - similar to above
50			SP		SAND - similar to above
60			SP		SAND - similar to above
70			SP		SAND - uniform fine grain, dense, 15% calcareous cement, red, dry
80			SP		SAND - uniform fine grain, loose, red, moist
90			SP		SAND - similar to above Top of Saturation at 91.0' below grade
100			SP		SAND - similar to above except with minor calcareous fine gravel
			GP		SANDY GRAVEL - fine calcareous and chert gravel, 45% fine sand, loose, red

COMPLETION DATA

MATERIAL SETTING / MATERIAL DESCRIPTION



JONES AND NEUSE, INC. CONSULTING ENGINEERS AUSTIN, TEXAS

Monitor Well Installation

CLIENT: Fina Oil and Chemical Co JOB NO.: 119505 DATE DRILLED: 9-12-87 WELL NO.: MW-41A

SITE: Big Spring, Texas ELEVATION: PAD 2487.05 TOP OF PVC CASING 2489.88

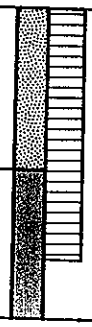
TOTAL DEPTH: 132.72' TOC CASING SIZE & TYPE: 2" ID PVC Flush Threaded SCREEN SIZE: 0.020 mill slot

WATER LEVEL: 92.31' REF.: TOC DATE: 10-1-87 TIME: 1514 hrs. GEOLOGIST: Robert L. Sherrill

DEPTH	N. VALUE (BLOW/FT)	POCKET PENETROMETER (TONS/FT²)	SYMBOL	STRATIGRAPHY	SAMPLE DESCRIPTION
120			GP		SANDY GRAVEL - fine calcareous and chert gravel, 45% fine sand, loose, red
			GP		SANDY GRAVEL - similar to above
130			CH		CLAY - highly plastic, dense, red, dry — Ogallala FM, Dockum Group
					Boring Terminated at 135 feet below grade
140					
150					
160					
170					
180					
190					
200					
210					

COMPLETION DATA

MATERIAL SETTING	MATERIAL DESCRIPTION CONT'D.
123.2	Filter Pack
130	Collapse
135	



JONES AND NEUSE, INC. CONSULTING ENGINEERS AUSTIN, TEXAS

ATTACHMENT XI.D.3.C(2)B-B
MONITOR WELL CONSTRUCTION LOGS – BICA AREA

MONITOR WELL INSTALLATION

WELL NO.: MW-52

CLIENT: Fina Oil and Chemical Company JOB NO.: 119505 DATE DRILLED: _____ SHEET 1 of 2

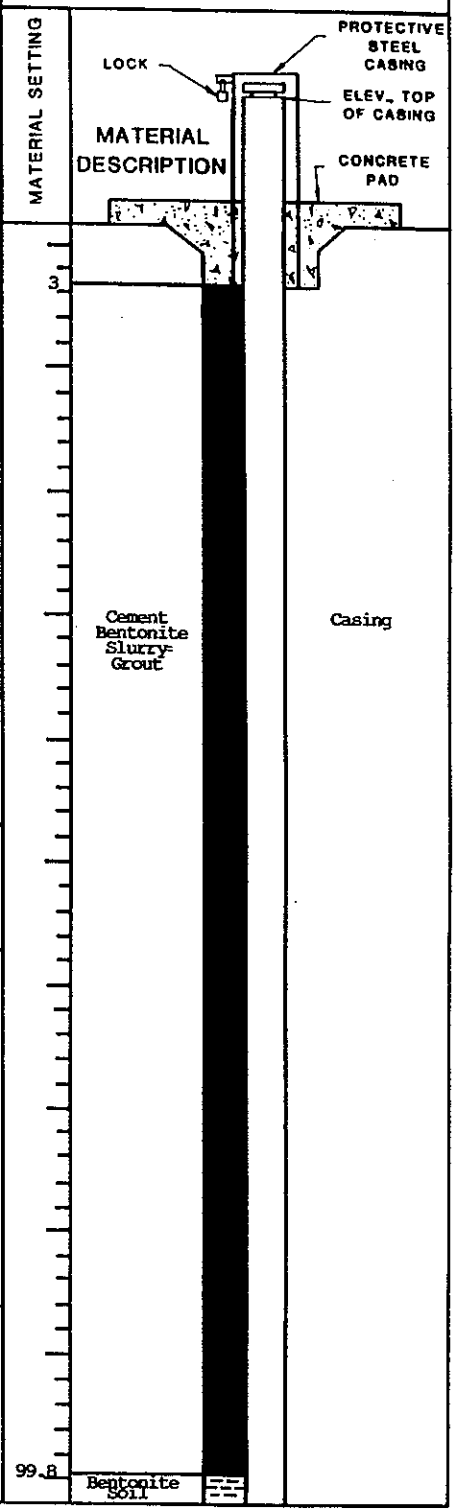
SITE: Site B/Big Spring, Texas ELEVATION: PAD 2515.35 TOP OF PVC CASING 2517.60

TOTAL DEPTH: 2390.10 CASING SIZE & TYPE: 2-inch ID PVC SCREEN SIZE: 0.010 mill slot

WATER LEVEL: 111.68 REF.: TOC DATE: 4/4/89 TIME: 1133 hrs GEOLOGIST: Robert L. Sherrill

DEPTH	N. VALUE (BLOW/FT)	POCKET PENETROMETER (TONS/FT²)	SYMBOL	STRATIGRAPHY	SAMPLE DESCRIPTION
0			SP		Sand - uniform fine, loose, orange, drill, FILL
10			SP		Sand - similar to above, FILL
20			SP		Sand - uniform fine, loose, red, dry
30			SP		Sand - similar to above with minor silt in pockets
40			SP		Sand - similar to above without silt
50			SP		Sand - similar to above with minor isolated calcareous gravel
60			SP		Gravelly Sand - similar to above except 10% fine subrounded calcareous gravel
70			SP		Gravelly Sand - similar to above except 15% medium subrounded calcareous gravel
80			SP		Gravelly Sand - similar to above
90			SP		Sand - uniform fine sand, loose, red, dry, no odor
100			SP		Sand - similar to above

COMPLETION DATA



JONES AND NEUSE, INC.
Engineering and Environmental Consultants
Austin, Houston, Bellaire, Temple, Corpus Christi, Orange

MONITOR WELL INSTALLATION

WELL NO.: MW-52

CLIENT: Fina Oil and Chemical Company JOB NO.: 119505 DATE DRILLED: _____ SHEET 2 of 2

SITE: Site B/Big Spring, Texas ELEVATION: PAD _____ TOP OF PVC CASING _____

TOTAL DEPTH: _____ CASING SIZE & TYPE: 2 in ID PVC SCREEN SIZE: 0.010 mill slot

WATER LEVEL : _____ REF.: TOC DATE: 4/4/89 TIME: _____ GEOLOGIST: Robert L. Sherrill

DEPTH	N. VALUE (BLOW/FT.)	POCKET PENETROMETER (TONS/FT^2)	SYMBOL	STRATIGRAPHY	SAMPLE DESCRIPTION
100					▼ Top of saturation
110			SP		Sand - similar to above except saturated
120			SP		Sand - similar to above
130			SP		Sand - similar to above
					Boring terminated at 130 feet

COMPLETION DATA

MATERIAL SETTING	MATERIAL DESCRIPTION CONT.
102.8	Bentonite Seal
105	Filter Pack
125	
130	

Casing

Screen

JONES AND NEUSE, INC.
Engineering and Environmental Consultants

MONITOR WELL INSTALLATION

WELL NO.: ~~MW-52A~~

CLIENT: Fina Oil and Chemical Company JOB NO.: 119505 DATE DRILLED: 3/31/89 SHEET 1 of 2

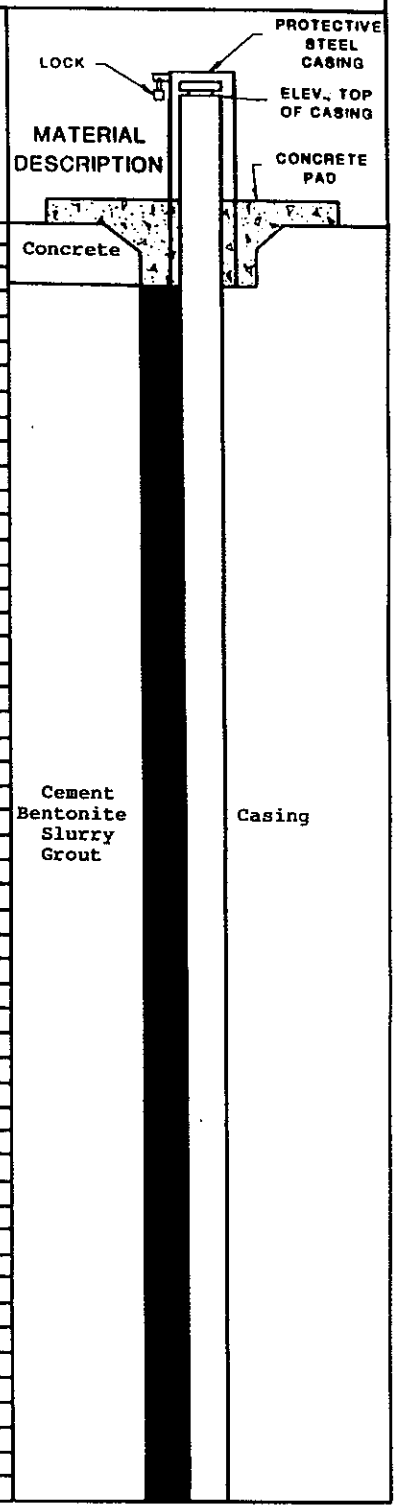
SITE: Site H/Big Spring, Texas ELEVATION: PAD 2515.33 TOP OF PVC CASING 2517.53

TOTAL DEPTH: 2358.08 CASING SIZE & TYPE: 2 in ID PVC SCREEN SIZE: 0.010 mill slot

WATER LEVEL: 111.50 REF.: TOC DATE: 4/4/89 TIME: 1130 hrs GEOLOGIST: Robert L. Sherrill

DEPTH	N. VALUE (BLOW/FT)	POCKET PENETROMETER (TONS/FT²)	SYMBOL	STRATIGRAPHY	SAMPLE DESCRIPTION
0			SP		Sand - uniform fine, loose, orange, dry, FILL
10			SP		Sand - similar to above, FILL
20			SP		Sand - uniform fine, loose, red, dry
30			SP		Sand - similar to above with minor silt in pockets
40			SP		Sand - similar to above without silt
50			SP		Sand - similar to above with minor
60			SP		Gravelly Sand - similar to above except 10% fine subrounded calcareous gravel
70			SP		Gravelly Snad - similar to above except 15% medium subrounded calcareous gravel
80			SP		Gravelly Sand - similar to above
90			SP		Sand - uniform fine sand, loose, red, dry, no odor
100			SP		Sand - similar to above

COMPLETION DATA



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MONITOR WELL INSTALLATION

WELL NO.: MW-52A

CLIENT: Fina Oil and Chemical Company JOB NO.: 119505 DATE DRILLED: _____ SHEET 2 of 2

SITE: Site H/ Big Spring, Texas ELEVATION: PAD 2515.33 TOP OF PVC CASING 2517.53

TOTAL DEPTH: 2358.08 CASING SIZE & TYPE: 2 in ID PVC SCREEN SIZE: 0.010 mill slot

WATER LEVEL : 111.50 REF.: TOC DATE: 4/4/89 TIME: 1130 hrs GEOLOGIST: Robert L. Shergill

DEPTH	N. VALUE (BLOW/FT.)	POCKET PENETROMETER (TONS/FT^2)	SYMBOL	STRATIGRAPHY	SAMPLE DESCRIPTION
100					▼ Top of Saturation
110			SP		Sand - similar to above except saturated
120			SP		Sand - similar to above
130			SP		Sand - similar to above
140			GP		Sandy Gravel - poorly graded, 90% rounded chert and calcareous gravel, medium, 10% fine sand, loose, red, saturated
			CH		Clay - highly plastic, hard, damp, red
150			GP		Sandy Gravel - poorly graded, 90% rounded chert and calcareous gravel, medium, 10% medium sand, loose, red, saturated
160			CH		Clay - highly plastic, hard, damp, red
					Boring terminated 160 feet below grade

COMPLETION DATA

MATERIAL SETTING	MATERIAL DESCRIPTION CONT.
	Cement/Bentonite Slurry Grout
131.9	
	Bentonite Seal
134.8	
137	
	Filter Pack
157	
157.3	Collapse
160	

Casing

Screen

JONES AND NEUSE, INC.
Engineering and Environmental Consultants

INVESTIGATION WELL INSTALLATION

WELL NO.: IW-58

CLIENT: Fina Oil and Chemical Company JOB NO.: 119505 DATE DRILLED: 7/11/90 SHEET 1 of 2

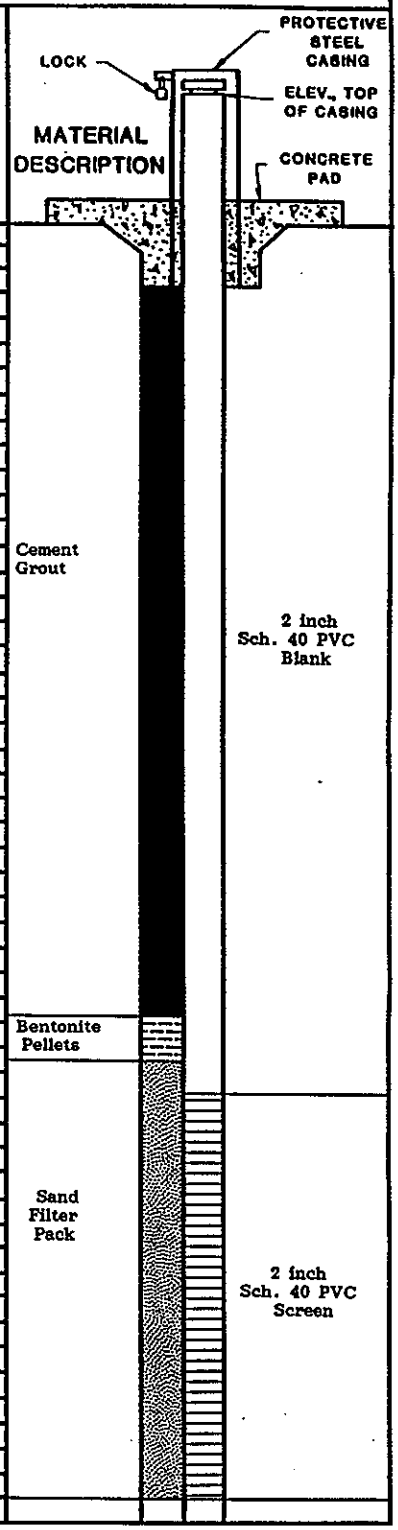
SITE: Big Spring, Texas ELEVATION: PAD 2435.34 TOP OF PVC CASING 2437.84

TOTAL DEPTH of Boring: 110.0' CASING SIZE & TYPE: 2 inch Sch. 40 PVC SCREEN SIZE: 0.010 mill slot

WATER LEVEL: 2373.09 REF.: TOC DATE: 7/17/90 TIME: _____ GEOLOGIST: Robert Bartels

DEPTH	N. VALUE (BLOW/FT)	POCKET PENETROMETER (TONS/FT²)	SYMBOL	STRATIGRAPHY	SAMPLE DESCRIPTION
0			SM		Silty Sand - uniform, very fine, loose, dry, light brown, dry
					Caliche - no plasticity, hard, light tan and white, dry, well cemented
10			SP		Sand - uniform, fine, loose, tan, dry, no odor, with zones of calcareous cementation and caliche - hard, well cemented from 12-13.0'
20			SP		Sand - similar to above
30			SP		Sand - similar to above, with 25-30% calcareous cementation at 30-32'
40			SP		Sand - similar to above, except light orange to orange with decreased caliche content - 10-15% calcareous cementation from 45-48.0'
50			SP		Sand - similar to above, slightly cemented from 59-60'
60			SP		Sand - similar to above, damp-moist at 68'
70			SP		Sand - similar to above, except saturated at 70.0', with odor - 10-15% calcareous cementation from 75-77' and 78-80'
80					
90			GP		Sandy Gravel - uniform, fine to medium, subrounded chert and limestone, loose, tan, saturated, with odor, with 20-25% fine-very coarse sand
100			CH		Clay - medium to high plasticity, stiff, damp to dry, red, no odor

COMPLETION DATA



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INVESTIGATION WELL INSTALLATION

WELL NO.: IW-58

CLIENT: Fina Oil and Chemical Company JOB NO.: 119505 DATE DRILLED: 7/11/90 SHEET 2 of 2

SITE: Big Spring, Texas ELEVATION: PAD 2435.34 TOP OF PVC CASING 2373.09

TOTAL DEPTH of Boring: 110.0' CASING SIZE & TYPE: 2 inch Sch. 40 PVC SCREEN SIZE: 0.010 mil slot

WATER LEVEL: 2437.84 REF.: TOC DATE: 7/17/90 TIME: GEOLOGIST: Robert Bartels

DEPTH	N. VALUE (BLOW/FT)	POCKET PENETROMETER (TONS/FT2)	SYMBOL	STRATIGRAPHY	SAMPLE DESCRIPTION	COMPLETION DATA: MATERIAL SETTING	COMPLETION DATA: MATERIAL DESCRIPTION
100			CH		Clay - medium to high plasticity, stiff, damp to dry, red, no odor		
110					Boring terminated 110.0 feet below ground surface		

JONES AND NEUSE, INC.
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MONITOR WELL CONSTRUCTION

WELL NO. IW-58A

CLIENT: FINA OIL AND CHEMICAL COMPANY JOB NO: 019505.02 SHEET 1 OF 2

SITE: SOUTH BOUNDARY – PHASE III DATE: START: 19 Jan 94; 0810 FINISH: 19 Jan 94; 0943

GEOLOGIST: James D. Shotwell DRILLER: Dusty Choate DRILLING RIG TYPE: Failing 1000

DRILLING METHODS: Air Rotary TOTAL DEPTH: 110 feet HOLE DIAMETER: 6.75–inches

SITE COORDINATES: 238736.57' N and 792356.78' E ELEVATIONS: GROUND: 2435.88' PAD: 2436.38' TOC: 2439.01' PROT. CSG: 2439.38'

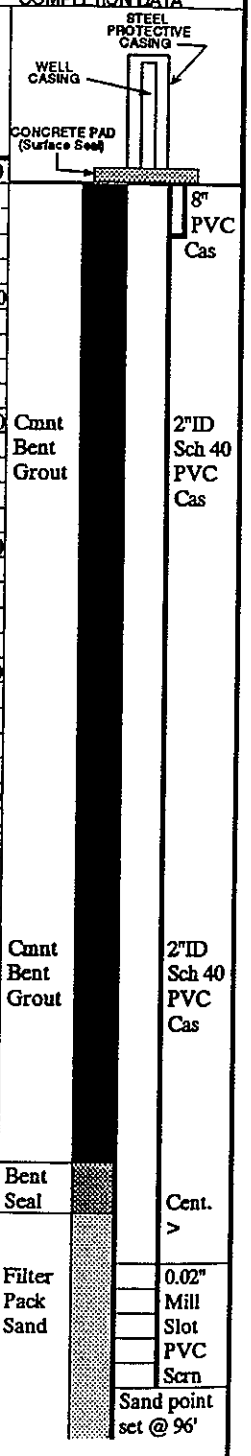
WATER LEVEL: DEPTH: 65.16' DATUM: TOC DATE: 20 Jan 94 TIME: 0805

JONES AND NEUSE, INC.
Environmental and Engineering Consultants

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION
0				SP	SAND	uniform, fine, loose, red, damp, no odor.
10				Ss	CALICHE	very fine, well cemented, hard, calcareous and siliceous, white, dry, no odor.
				SP	SAND	uniform, fine, loose, damp, red, dry, no odor.
20				SP	SAND	as above.
30				SP	SAND	as above.
40				SP	SAND	as above.
50				SP	SAND	as above.
60				SP	SAND	as above.
						SATURATION @ 67 feet; phenolic? odor.
70				SP	SAND	as above, saturated, very slight, odor.
80				SP	SAND	as above.
90				GP	SANDY GRAVEL	uniform, fine to coarse, loose, siliceous and calcareous, '<2% fine, Sand.
100				CH	CLAY (@ 95')	highly plastic, hard, orange–red, damp.

(Continued on page 2)

COMPLETION DATA



(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MONITOR WELL CONSTRUCTION

WELL NO. IW–58A

CLIENT: FINA OIL AND CHEMICAL COMPANY JOB NO: 019505.02 SHEET 2 OF 2

SITE: PHASE III – SOUTH BOUNDARY DATE: START: 19 Jan 94; 0810 FINISH: 19 Jan 94; 0943

GEOLOGIST: James D. Shotwell DRILLER: Dusty Choate DRILLING RIG TYPE: Failing 1000

DRILLING METHODS: Air Rotary TOTAL DEPTH: 110 feet HOLE DIAMETER: 6.75–inch

SITE COORDINATES: 238736.57' N and 792356.78' E ELEVATIONS: GROUND: 2435.88' PAD: 2436.38' TOC: 2439.01' PROT. CSG: 2439.38'

WATER LEVEL: DEPTH: 65.16' DATUM: TOC DATE: 20 Jan 94 TIME: 0805

JONES AND NEUSE, INC.
Environmental and Engineering Consultants

LITHOLOGIC DESCRIPTION

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION
100				CH		CLAY as above.
110				CH		CLAY as above.
						Boring terminated 110 feet below grade level.

COMPLETION DATA

MATERIAL SETTINGS

BELOW GRADE MATERIAL COMPLETIONS CONTINUED FROM PREVIOUS PAGE

Filter Pack Sand

(1) UNIFIED SOIL CLASSIFICATION SYSTEM

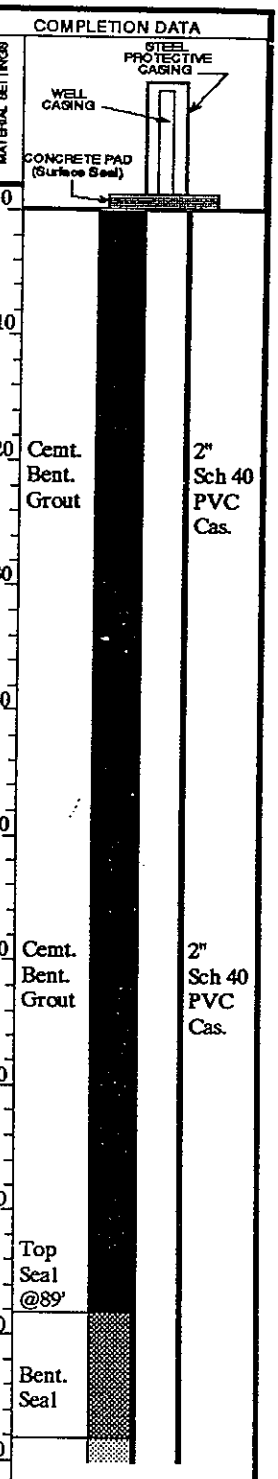
MONITOR WELL CONSTRUCTION

CLIENT: FINA OIL & CHEMICAL COMPANY JOB NO: 019505.1 WELL NO. MW-76
SITE: BIG SPRING, TEXAS DATE: START: June 5, 1992 SHEET 1 OF 2 FINISH: June 5, 1992
GEOLOGIST: James D. Shotwell DRILLER: Dusty Choate DRILLING RIG TYPE: Failing 1000
DRILLING METHODS: Air Rotary TOTAL DEPTH: 130 feet HOLE DIAMETER: 6.75 inches
SITE COORDINATES: 247976.00' N + 790629.76' E ELEVATIONS: GROUND: NA PAD: 2519.47 TOC: 2522.22 PROT. CSG: 2522.47
WATER LEVEL: DEPTH: 116.36 Feet DATUM: TOC DATE: June 11, 1992 TIME: 9:05 AM

JONES AND NEUSE, INC.
Environmental and Engineering Consultants

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION
0				SP		SAND uniform, fine grained, loose, red, moist.
10				SP		SAND as above.
20				SP		SAND as above.
30				SP		SAND as above.
40				SP		SAND as above, dry.
50				SP		GRAVELLY SAND uniform, fine grained, loose, red, dry, with <2% GRAVEL fine, loose, calcareous, cherty, off-white, dry.
60				SP		SAND uniform, fine grained, red, dry.
70				SP		SAND as above.
80				SP		SAND as above.
90				SP		SAND as above.
100				SP		SAND as above, becoming damp.

COMPLETION DATA



(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MW-STAND.WK3

MONITOR WELL CONSTRUCTION

CLIENT: FINA OIL & CHEMICAL COMPANY | JOB NO: 019505.1 | WELL NO. MW-76
SITE: BIG SPRING, TEXAS | DATE: START: June 5, 1992 | SHEET 2 OF 2 | FINISH: June 5, 1992
GEOLOGIST: James D. Shotwell | DRILLER: Dusty Choate | DRILLING RIG TYPE: Failing 1000
DRILLING METHODS: Air Rotary | TOTAL DEPTH: 130 feet | HOLE DIAMETER: 6.75 inches
SITE COORDINATES: 247976.00' N + 790629.76' E | ELEVATIONS: GROUND: NA | PAD: 2519.47 | TOC: 2522.22 | PROT. CSG: 2522.47
WATER LEVEL: DEPTH: 116.36 Feet | DATUM: TOC | DATE: June 11, 1992 | TIME: 9:05 AM

JONES AND NEUSE, INC.
Environmental and Engineering Consultants

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION
100				SP		SAND as above, becoming moist.
						SATURTATION @ 101 FEET
				SP		GRAVELLY SAND uniform fine grained, loose, red, saturated with <5% GRAVEL fine, loose, calcareous, cherty, dark gray.
110				SP		SAND uniform, fine grained, loose, red, saturated.
120				SP		SAND as above.
130				SP		SAND as above.
						Boring terminated at 130 feet below grade.
140						
150						
160						
170						
180						
190						
200						

COMPLETION DATA

MATERIAL SETTING

BELOW GRADE MATERIAL COMPLETIONS CONTINUED FROM PREVIOUS PAGE

Filter Pack Sand

0.02" PVC Mill Slot Scrn.

Screen set @ 120'

(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MW-P2-SC.WK3

MONITOR WELL CONSTRUCTION

WELL NO. MW-76A

CLIENT: FINA OIL & CHEMICAL COMPANY JOB NO: 019505.1 SHEET 1 OF 2

SITE: BIG SPRING, TEXAS DATE: START: June 5, 1992 FINISH: June 5, 1992

GEOLOGIST: James D. Shotwell DRILLER: Dusty Choate DRILLING RIG TYPE: Failing 1000

DRILLING METHODS: Air Rotary TOTAL DEPTH: 180 feet HOLE DIAMETER: 6.75 inches

SITE COORDINATES: 247974.81' N + 790620.73' E ELEVATIONS: GROUND: NA PAD: 2519.14 TOC: 2521.89 PROT. CSG: 2522.14

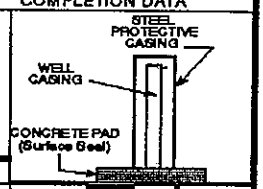
WATER LEVEL: DEPTH: 112.69 Feet DATUM: TOC DATE: June 12, 1992 TIME: 9:05 AM

JONES AND NEUSE, INC.
Environmental and Engineering Consultants

LITHOLOGIC DESCRIPTION

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	
0				SP		SAND uniform, fine grained, loose, red, moist.
10				SP		SAND as above.
20				SP		SAND as above.
30				SP		SAND as above.
40				SP		SAND as above, dry.
50				SP		GRAVELLY SAND uniform, fine grained, loose, red, dry, with <2% GRAVEL fine, loose, calcareous, cherty, off-white, dry.
60				SP		SAND uniform, fine grained, red, dry.
70				SP		SAND as above.
80				SP		SAND as above.
90				SP		SAND as above.
100				SP		SAND as above, becoming damp.

COMPLETION DATA



MATERIAL SETTINGS		
0		
20	Cemt. Bent. Grout	2" Sch 40 PVC Cas.
80	Cemt. Bent. Grout	2" Sch 40 PVC Cas.

(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MW-STAND.WK3

MONITOR WELL CONSTRUCTION

WELL NO. MW-76A

CLIENT: FINA OIL & CHEMICAL COMPANY JOB NO: 019505.1 SHEET 2 OF 2

SITE: BIG SPRING, TEXAS DATE: START: June 5, 1992 FINISH: June 5, 1992

GEOLOGIST: James D. Shotwell DRILLER: Dusty Choate DRILLING RIG TYPE: Failing 1000

DRILLING METHODS: Air Rotary TOTAL DEPTH: 180 feet HOLE DIAMETER: 6.75 inches

SITE COORDINATES: 247974.81' N + 790620.73' E ELEVATIONS: GROUND: NA PAD: 2519.14 TOC: 2521.89 PROT. CSG: 2522.14

WATER LEVEL: DEPTH: 112.69 Feet DATUM: TOC DATE: June 12, 1992 TIME: 9:05 AM

JONES AND NEUSE, INC.
Environmental and Engineering Consultants

LITHOLOGIC DESCRIPTION

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	
100				SP		SAND as above, becoming moist. SATURTATION @ 101 FEET
				SP		GRAVELLY SAND uniform fine grained, loose, red, saturated with <5% GRAVEL fine, loose, calcareous, cherty, dark gray.
110				SP		SAND uniform, fine grained, loose, red, saturated.
120				SP		SAND as above.
130				SP		SAND as above.
140				SP		SAND as above.
				SP		GRAVELLY SAND uniform, fine grained, loose, red, saturated, with 10% coarse sand and caliche GRAVEL fine, loose, white to off-wh.
150				SP		GRAVELLY SAND as above.
160				CH		TOP DOCKUM CLAY highly plastic, hard,red, dry.
				CH		CLAY as above.
170				CH		CLAY as above.
180				CH		CLAY as above.
						Boring terminated at 180 feet below grade.
190						
200						

COMPLETION DATA

MATERIAL SETTING

BELOW GRADE MATERIAL COMPLETIONS CONTINUED FROM PREVIOUS PAGE

- 2" Sch 40 Pvc Cas.
- Bent. Seal
- Base Seal @ 127'
- Filter Pack Sand
- 0.020" PVC Mill Slot Scrn.

(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MW-P2-SC.WK3

MONITOR WELL CONSTRUCTION

WELL NO. MW–78

CLIENT: FINA OIL & CHEMICAL COMPANY JOB NO: 019505.1 SHEET 1 OF 1

SITE: BIG SPRING, TEXAS DATE: START: June 6, 1992 FINISH: June 6, 1992

GEOLOGIST: James D. Shotwell DRILLER: Dusty Choate DRILLING RIG TYPE: Failing 1000

DRILLING METHODS: Air Rotary TOTAL DEPTH: 65 feet HOLE DIAMETER: 6.75 inches

SITE COORDINATES: 237751.18' N + 791127.67' E ELEVATIONS: GROUND: NA PAD: 2415.95 TOC: 2418.59 PROT. CSG: 2418.90

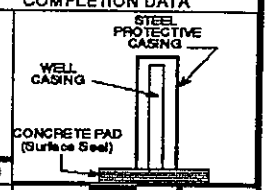
WATER LEVEL: DEPTH: 50.07 Feet DATUM: TOC DATE: June 20, 1992 TIME: 10:15 AM

JONES AND NEUSE, INC.
Environmental and Engineering Consultants

LITHOLOGIC DESCRIPTION

DEPTH (FEET)	USCS SYMBOL (1)		
0	SP	SAND	uniform, fine grained, moderately cemented with 25% calcareous cement, light red, dry.
10	SP	SAND	uniform, fine grained, loose, red, dry.
20	SP	SAND	as above.
30	SP	GRAVELLY SAND	uniform, fine grained, loose, red, dry with 5% caliche GRAVEL fine, loose, calcareous, cherty, off–white, dry
	SP	SAND	uniform, fine grained, loose, red, dry.
40	SP	SAND	as above. SATURATION @ 40 FEET
50	SP	GRAVELLY SAND	uniform, fine grained, loose, red, dry, with 10% caliche GRAVEL fine, loose, calcareous, cherty, white.
60	SP	GRAVELLY SAND	as above.
	CH	SILTY CLAY	slightly plastic, mod. hard, off–white, <5% SILT.
70		Boring terminated 65 feet below grade.	
80			
90			
100			

COMPLETION DATA



MATERIAL SETTINGS	
0	
10	Cemt. Bent. Grout
20	Top Seal @ 27'
30	Bent. Seal
40	Filter Pack Sand
50	
60	
	Screen set @ 59'

2" Sch 40 PVC Cas.

Top Screen @ 39'

0.020" PVC Mill Slot Scrn.

(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MW–STAND.WK3

MONITOR WELL CONSTRUCTION

WELL NO. MW-78A

CLIENT: FINA OIL & CHEMICAL COMPANY JOB NO: 019505.1 SHEET 1 OF 1

SITE: BIG SPRING, TEXAS DATE: START: June 6, 1992 FINISH: June 6, 1992

GEOLOGIST: James D. Shotwell DRILLER: Dusty Choate DRILLING RIG TYPE: Failing 1000

DRILLING METHODS: Air Rotary TOTAL DEPTH: 90 feet HOLE DIAMETER: 6.75 inches

SITE COORDINATES: 237741.82' N + 791127.69' E ELEVATIONS: GROUND: NA PAD: 2416.19 TOC: 2418.85 PROT. CSG: 2419.04

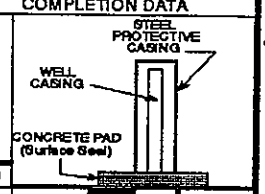
WATER LEVEL: DEPTH: 50.55 Feet DATUM: TOC DATE: June 20, 1992 TIME: 10:15 AM

JONES AND NEUSE, INC.
Environmental and Engineering Consultants

LITHOLOGIC DESCRIPTION

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION
0				SP		SAND uniform, fine grained, moderately cemented with 25% calcareous cement, light red, dry.
10				SP		SAND uniform, fine grained, loose, red, dry.
20				SP		SAND as above.
30				SP		GRAVELLY SAND uniform, fine grained, loose, red, dry with 5% caliche GRAVEL fine, loose, calcareous, cherty, off-white, dry.
				SP		SAND uniform, fine grained, loose, red, dry.
40				SP		SAND as above. SATURATION @ 40 FEET
50				SP		GRAVELLY SAND uniform, fine grained, loose, red, dry, with 10% caliche GRAVEL fine, loose, calcareous, cherty, white.
60				SP		GRAVELLY SAND as above.
				CH		SILTY CLAY slightly plastic, mod. hard, off-white, <5% SILT.
70				GP		GRAVEL uniform, coarse, subrounded quartzitic, cherty and calcareous pebbles
				GP		GRAVEL as above.
				CH		TOP DOCKUM CLAY highly plastic, hard, red, dry, strong odor.
80				CH		CLAY as above.
90				CH		CLAY as above.
100						Boring terminated at 90 below grade.

COMPLETION DATA



MATERIAL SETTINGS	
0	
10	
20	Cemt. Bent. Grout
30	
40	
50	Top Seal @ 55'
	Bent. Seal
60	Base @ 63'
70	Filter Pack Sand
80	
90	
100	

2" Sch 40 PVC Cas.

0.020" PVC Mill Slot Scrn.

(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MW-STAND.WK3

MONITOR WELL CONSTRUCTION

WELL NO. MW--79

CLIENT: FINA OIL & CHEMICAL COMPANY JOB NO: 019505.1 SHEET 1 OF 1

SITE: BIG SPRING, TEXAS DATE: START: June 7, 1992 FINISH: June 7, 1992

GEOLOGIST: James D. Shotwell DRILLER: Dusty Choate DRILLING RIG TYPE: Failing 1000

DRILLING METHODS: Air Rotary TOTAL DEPTH: 80 feet HOLE DIAMETER: 6.75 inches

SITE COORDINATES: 237967.67' N + 792296.12' E ELEVATIONS: GROUND: NA PAD: 2436.40 TOC: 2439.07 PROT. CSG: 2439.30

WATER LEVEL: DEPTH: 70.73 Feet DATUM: TOC DATE: June 21, 1992 TIME: 7:30 AM

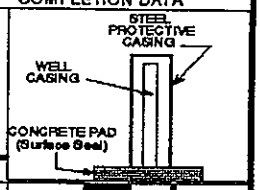
JONES AND NEUSE, INC.
Environmental and Engineering Consultants

LITHOLOGIC DESCRIPTION

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	
0				SP		SAND uniform, very fine grained, poorly cemented with 5% calcareous cement, light tan, dry.
10				SP		SAND as above.
				SP		– becoming fine grained.
20				SP		SAND as above, becoming red.
				SP		SAND uniform, fine grained, loose, red, damp.
30				SP		SAND as above.
40				SP		SAND as above.
				SC		CLAYEY SAND uniform, very fine grained, mod. cemented, tan, damp, with 20% CLAY.
50				CL		SILTY CLAY moderately plastic, soft, tan, damp, with 10% SILT. SATURATION @ 52 FEET.
60				CL		SILTY CLAY as above, with slight odor.
70				SP		SAND uniform, fine grained, loose, red, saturated, odor.
80				SP		SAND as above.
						Boring terminated 80 feet below grade.
90						
100						

COMPLETION DATA

MATERIAL SETTINGS



(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MW--STAND.WK3

MONITOR WELL CONSTRUCTION

WELL NO. MW–79A

CLIENT: FINA OIL & CHEMICAL COMPANY JOB NO: 019505.1 SHEET 1 OF 2

SITE: BIG SPRING, TEXAS DATE: START: June 7, 1992 FINISH: June 7, 1992

GEOLOGIST: James D. Shotwell DRILLER: Dusty Choate DRILLING RIG TYPE: Failing 1000

DRILLING METHODS: Air Rotary TOTAL DEPTH: 120 feet HOLE DIAMETER: 6.75 inches

SITE COORDINATES: 237965.10' N + 792288.00' E ELEVATIONS: GROUND: NA PAD: 2436.07 TOC: 2438.74 PROT. CSG: 2438.97

WATER LEVEL: DEPTH: 70.31 Feet DATUM: TOC DATE: June 21, 1992 TIME: 7:30 AM

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION
0				SP		SAND uniform, very fine grained, poorly cemented with 5% calcareous cement, light tan, dry.
10				SP		SAND as above.
				SP		– becoming fine grained.
20				SP		SAND as above, becoming red.
				SP		SAND uniform, fine grained, loose, red, damp.
30				SP		SAND as above.
40				SP		SAND as above.
				SC		CLAYEY SAND uniform, very fine grained, mod. cemented, tan, damp, with 20% CLAY.
50				CL		SILTY CLAY moderately plastic, soft, tan, damp, with 10% SILT. SATURATION @ 52 FEET.
60				CL		SILTY CLAY as above, with slight odor.
70				SP		SAND uniform, fine grained, loose, red, saturated, odor.
80				SP		SAND as above.
90				SP		SAND as above.
				GP		SANDY GRAVEL gap graded, fine to coarse, subrounded quartz and limestone pebbleswith 15% SAND uniform, fine grained, loose, red,
100				SP		SAND uniform, saturated, odor. medium grained, loose, red, saturated, odor.

(continued on page 2)

JONES AND NEUSE, INC.
Environmental and Engineering Consultants

COMPLETION DATA

MATERIAL SETTINGS	
0	STEEL PROTECTIVE CASING; WELL CASING; CONCRETE PAD (Surface Seal)
20	Cemt. Bent. Grout; 2" Sch 40 PVC Cas.
60	2" Sch 40 PVC Cas.
80	Top Seal @ 81'
	Bent. Seal
90	Top Screen @ 91'
	Filter Pack Sand; 0.020" Mill Slot Scrn.
100	

(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MW–STAND.WK3

MONITOR WELL CONSTRUCTION

CLIENT: FINA OIL & CHEMICAL COMPANY JOB NO: 019505.1 WELL NO. MW-79A
SITE: BIG SPRING, TEXAS DATE: START: June 7, 1992 SHEET 2 OF 2 FINISH: June 7, 1992
GEOLOGIST: James D. Shotwell DRILLER: Dusty Choate DRILLING RIG TYPE: Failing 1000
DRILLING METHODS: Air Rotary TOTAL DEPTH: 120 feet HOLE DIAMETER: 6.75 inches
SITE COORDINATES: 237965.10' N + 792288.00' E ELEVATIONS: GROUND: NA PAD: 2436.07 TOC: 2438.74 PROT. CSG: 2438.97
WATER LEVEL: DEPTH: 70.31 Feet DATUM: TOC DATE: June 21, 1992 TIME: 7:30 AM

JONES AND NEUSE, INC.
Environmental and Engineering Consultants

LITHOLOGIC DESCRIPTION

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	
100				GP		SANDY GRAVEL gap graded, fine to medium, loose, quartz and limestone pebbles, saturated with 5% SAND, strong odor.
110				GP		SANDY GRAVEL as above, strong odor.
				CH		TOP DOCKUM CLAY (@ 111') highly plastic, hard, red, dry.
				CH		CLAY as above.
120				CH		CLAY as above.
						Terminated soil boring at 120 feet below grade.
130						
140						
150						
160						
170						
180						
190						
200						

COMPLETION DATA

MATERIAL SETTINGS

BELOW GRADE MATERIAL COMPLETIONS CONTINUED FROM PREVIOUS PAGE

100
110 — Filter Pack Sand; 0.020" PVC Mill Slot Scrn.
120

Screen set @ 111'

130 140 150 160 170 180 190 200

(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MW-P2-SC.WK3

MONITOR WELL CONSTRUCTION

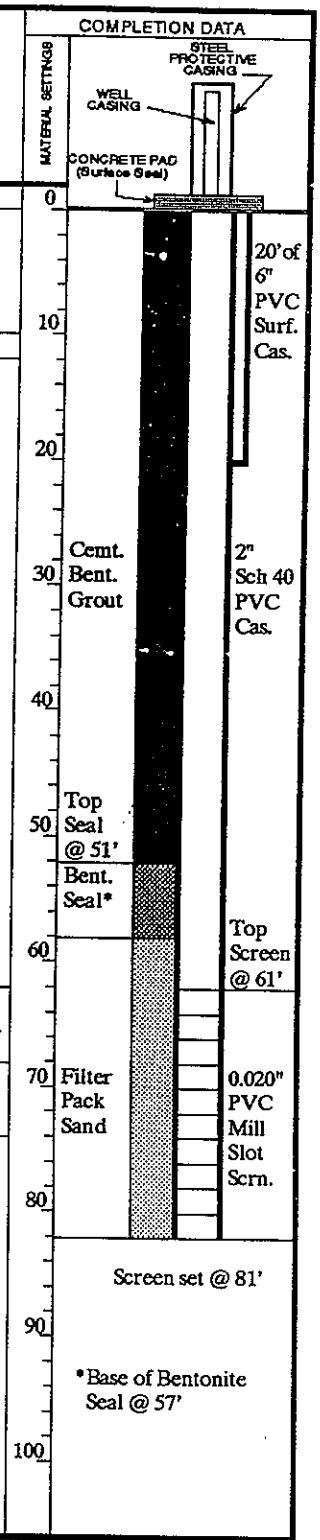
CLIENT: FINA OIL & CHEMICAL COMPANY JOB NO: 019505.1 WELL NO. MW-80
SITE: BIG SPRING, TEXAS DATE: START: June 8, 1992 SHEET 1 OF 2 FINISH: June 8, 1992
GEOLOGIST: James D. Shotwell DRILLER: Dusty Choate DRILLING RIG TYPE: Failing 1000
DRILLING METHODS: Air Rotary TOTAL DEPTH: 130 feet HOLE DIAMETER: 6.75 inches
SITE COORDINATES: 238485.73' N + 790471.29' E ELEVATIONS: GROUND: NA PAD: 2440.68 TOC: 2443.30 PROT. CSG: 2443.55
WATER LEVEL: DEPTH: 68.75 Feet DATUM: TOC DATE: June 21, 1992 TIME: 3:00 PM

JONES AND NEUSE, INC.
Environmental and Engineering Consultants

LITHOLOGIC DESCRIPTION

DEPTH (FEET)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION
0	SP	SAND	uniform, fine grained, loose, red, wet.
10	CH	WEATHERED CLAY	nonplastic, soft, light tan, damp.
	SP	SAND	uniform, fine grained, loose, red, moist.
20	SP	SAND	as above.
30	SP	SAND	as above, becoming dry.
40	SP	SAND	as above, dry.
50	SP	SAND	as above, dry.
	SP	SAND	uniform, fine to very fine grained, loose, red, dry.
60	SP	SAND	as above. TOP OF SATURATION @ 62 FEET, no odor.
	Ss	SANDSTONE	fg, mod. cemented, 10% calc. cement, lt. tan, weathered, saturated.
	Ss	SANDSTONE	fg–vfg, hard, well cem. w/ 25% calc cement, lt tan, unweathered, damp.
70	SP	CLAYEY GRAVELLY SAND	uniform, fine grained, loose, red, saturated, containing 5% CLAY and 10% GRAVEL coarse, loose, calcareous, cherty, light tan, no odor.
80	GP	GRAVEL	gap graded, coarse to fine, loose quartz and limestone pebbles, subrounded to rounded, with <5% fine SAND, odor.
	GP	GRAVEL	as above.
90	GP	GRAVEL	as above.
100			

(continued on page 2)



(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MW-STAND.WK3

MONITOR WELL CONSTRUCTION

CLIENT: FINA OIL & CHEMICAL COMPANY JOB NO: 019505.1 WELL NO. MW-80
SITE: BIG SPRING, TEXAS DATE: START: June 8, 1992 SHEET 2 OF 2 FINISH: June 8, 1992
GEOLOGIST: James D. Shotwell DRILLER: Dusty Choate DRILLING RIG TYPE: Failing 1000
DRILLING METHODS: Air Rotary TOTAL DEPTH: 130 feet HOLE DIAMETER: 6.75 inches
SITE COORDINATES: 238485.73' N + 790471.29' E ELEVATIONS: GROUND: NA PAD: 2440.68 TOC: 2443.30 PROT. CSG: 2443.55
WATER LEVEL: DEPTH: 68.75 Feet DATUM: TOC DATE: June 21, 1992 TIME: 3:00 PM

JONES AND NEUSE, INC.
Environmental and Engineering Consultants

LITHOLOGIC DESCRIPTION

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION
100				GP		GRAVEL as above.
110				GP		GRAVEL uniform, fine, loose, quartz and limestone pebbles, with <5% fine SAND, saturated, odor.
				GP		GRAVEL as above.
120				CH		TOP DOCKUM CLAY highly plastic, hard, red, dry.
130				CH		CLAY as above.
						Boring terminated at 130 feet below grade.
						NOTE: From 5 – 15 feet below grade, there were pieces of wood, styrofoam, particle board, paper, brick, etc. that were noted when reaming to total depth with the 6.75–inch drill bit.

COMPLETION DATA

MATERIAL SETTINGS	BELOW GRADE MATERIAL COMPLETIONS
100	CONTINUED FROM PREVIOUS PAGE
110	
120	
130	
140	
150	
160	
170	
180	
190	
200	

(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MW-P2-SC.WK3

MONITOR WELL CONSTRUCTION

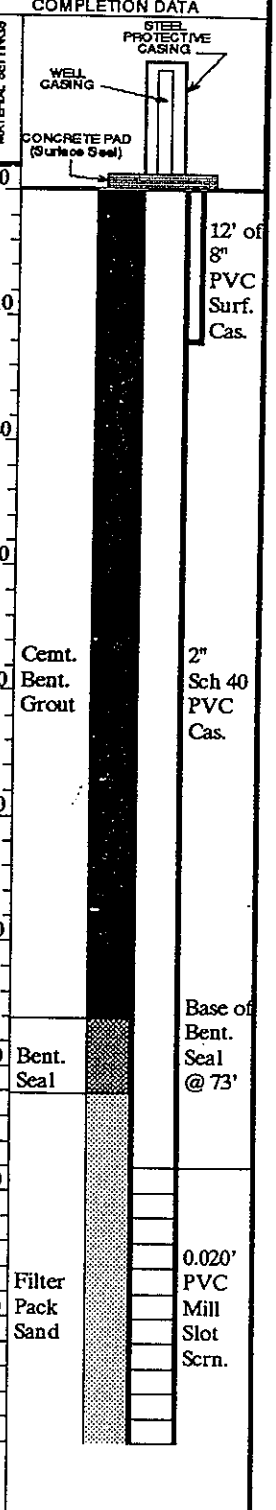
CLIENT: FINA OIL & CHEMICAL COMPANY JOB NO: 019505.1 WELL NO. MW-80A
SITE: BIG SPRING, TEXAS DATE: START: June 9, 1992 SHEET 1 OF 2 FINISH: June 9, 1992
GEOLOGIST: James D. Shotwell DRILLER: Dusty Choate DRILLING RIG TYPE: Failing 1000
DRILLING METHODS: Air Rotary TOTAL DEPTH: 120 feet HOLE DIAMETER: 6.75 inches
SITE COORDINATES: 238541.72' N + 790460.44' E ELEVATIONS: GROUND: NA PAD: 2439.91 TOC: 2442.71 PROT. CSG: 2443.27
WATER LEVEL: DEPTH: 66.35 Feet DATUM: TOC DATE: June 19, 1992 TIME: 3:05 PM

JONES AND NEUSE, INC.
Environmental and Engineering Consultants

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION
0				SP	SAND	uniform, fine grained, loose, red, damp.
10				SP	SAND	uniform, fine grained, loose, red, moist.
20				SP	SAND	as above.
30				SP	SAND	as above, dry.
40				SP	SAND	as above, dry.
50				SP	SAND	as above, dry.
60				SP	SAND	as above. TOP OF SATURATION @ 62 FEET.
70				SP	SAND	as above, saturated.
80				SC	CLAYEY SAND	uniform, fine grained, loose, red-tan, saturated, 10% CLAY.
90				SP	GRAVELLY SAND	uniform, fine grained, loose, red-tan, with 15% GRAVEL fine, loose, limestone and quartz pebbles, saturated.
100				SP	GRAVELLY SAND	as above, slight odor.

(continued on page 2)

COMPLETION DATA



(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MW-STAND.WK3

MONITOR WELL CONSTRUCTION

CLIENT: FINA OIL & CHEMICAL COMPANY | JOB NO: 019505.1 | WELL NO. MW-80A
SITE: BIG SPRING, TEXAS | SHEET 2 OF 2
GEOLOGIST: James D. Shotwell | DRILLER: Dusty Choate | DATE: START: June 9, 1992 FINISH: June 9, 1992
DRILLING METHODS: Air Rotary | DRILLING RIG TYPE: Failing 1000
SITE COORDINATES: 238541.72' N + 790460.44' E | ELEVATIONS: GROUND: NA | TOTAL DEPTH: 120 feet | HOLE DIAMETER: 6.75 inches
WATER LEVEL: DEPTH: 66.35 Feet | DATUM: TOC | PAD: 2439.91 | TOC: 2442.71 | PROT. CSG: 2443.27
DATE: June 19, 1992 | TIME: 3:05 PM

JONES AND NEUSE, INC.
Environmental and Engineering Consultants

LITHOLOGIC DESCRIPTION

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION
100				GP		GRAVEL as above.
110				CH		TOP DOCKUM CLAY highly plastic, hard, red, dry.
				CH		CLAY highly plastic, hard, red, dry.
120				CH		CLAY highly plastic, hard, red, dry.
						Boring terminated at 120 feet below grade.

COMPLETION DATA

MATERIAL GETTING IN

BELOW GRADE MATERIAL COMPLETIONS CONTINUED FROM PREVIOUS PAGE

Filter Pack Sand | 0.020" PVC Mill Slot Scrn.

(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MW-P2-SC.WK3

RECOVERY WELL CONSTRUCTION

WELL NO. RW-106

CLIENT: FINA OIL & CHEMICAL COMPANY JOB NO: 019505.2 SHEET 1 OF 1

SITE: BIG SPRING, TEXAS DATE: START: Aug 25, 1992 FINISH: Aug 26, 1992

GEOLOGIST: James D. Shotwell DRILLER: Dusty Choate DRILLING RIG TYPE: Failing 1000

DRILLING METHODS: Air Rotary TOTAL DEPTH: 85 feet HOLE DIAMETER: 12.25 inches

SITE COORDINATES: 240132.80' N + 791443.67' E ELEVATIONS: GROUND: NA PAD: 2440.58' TOC: 2442.67' PROT. CSG: 2442.45

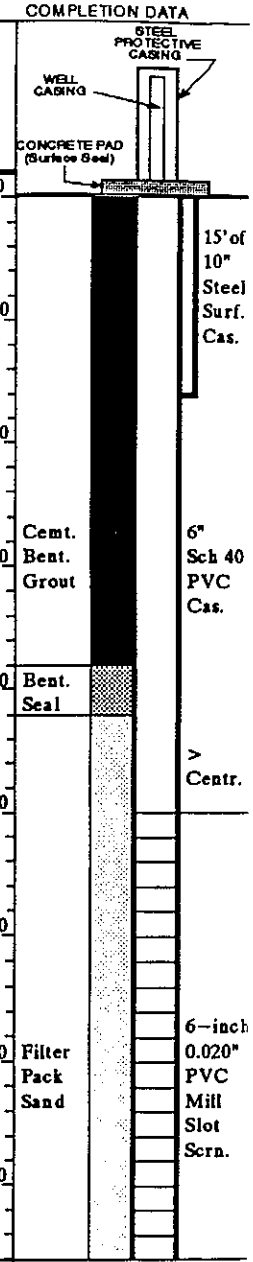
WATER LEVEL: DEPTH: 57.38 feet DATUM: TOC DATE: Aug. 26, 1992 TIME: 7:50 AM

JONES AND NEUSE, INC.
Environmental and Engineering Consultants

LITHOLOGIC DESCRIPTION

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION
0				SP		SAND uniform, fine grained, loose, red, dry.
10				SP		SAND as above.
20				SP		SAND as above.
30				SP		SAND as above.
40				SP		SAND as above.
50				SP		SAND as above.
60						Saturation @ 58 feet; Strong gasoline odor.
				SP		SAND as above, saturated, gasoline odor.
70				SP		SAND as above.
80				SP		SAND as above.
				SP		SAND as above.
90						Boring Terminated @ 85 feet below grade.
100						

COMPLETION DATA



(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MW-STAND.WK3

MONITOR WELL CONSTRUCTION

WELL NO. MW-109

CLIENT: FINA OIL & CHEMICAL COMPANY JOB NO: 019505.02 SHEET 1 OF 1

SITE: E.K. MORGAN RANCH – SOUTH BOUNDARY DATE: START: 02/18/93 FINISH: 02/18/93

GEOLOGIST: K. BECK DRILLER: D. CHOATE DRILLING RIG TYPE: FAILING 1000

DRILLING METHODS: AIR/WET ROTARY TOTAL DEPTH: 40 FEET HOLE DIAMETER: 7 7/8"

SITE COORDINATES: 236671.40'N / 791458.77'E ELEVATIONS: GROUND: N/A PAD: 2367.91' TOC: 2370.71' PROT. CSG: 2371.10'

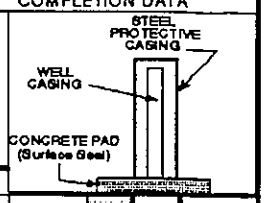
WATER LEVEL: DEPTH: 7.90 FEET DATUM: TOC DATE: 02/22/93 TIME: 20:16

JONES AND NEUSE, INC.
Environmental and Engineering Consultants

LITHOLOGIC DESCRIPTION

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	
0						
1	X			SP	SAND	– Uniform, brown, loose, moist, no odor.
3						
4	X					**SATURATION ENCOUNTERED AT 4'**
5	X			SP	SAND	– As above.
	X					
10	X			SP	SAND	– Uniform, fine grained, tan < 2% caliche gravel, no odor, shean appearing on water.
15	X			SP	SAND	– As above.
20	X			SP	SAND	– As above.
22						
25	X			SP	SAND	– As above.
26	X			GP	SANDY GRAVEL	– Coarse grained, subrounded, loose, with >20% fine SAND, chert, quartz.
30	X			CH	CLAY	– Highly plastic, orange to red, stiff, damp, staurated, DOCKUM CLAY @ 30 feet.
35	X			CH	CLAY	– As above.
40	X			CH	CLAY	– As above.
45						**BORING TERMINATED 40 FEET BELOW GRADE**
50						

COMPLETION DATA



MATERIAL SETTINGS	
0	
1	> Centr.
3	
5	
10	Filter Pack Sand
15	0.020" Mill Slot Scrn.
20	
22	
25	> Sand–point
30	
35	
40	
45	
50	

(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MW-109.WK3

MONITOR WELL CONSTRUCTION

WELL NO. MW-109A

CLIENT: FINA OIL & CHEMICAL COMPANY | JOB NO: 019505.02 | SHEET 1 OF 1

SITE: E.K. MORGAN RANCH – SOUTH BOUNDARY | DATE: START: 02/18/93 | FINISH: 02/18/93

GEOLOGIST: K. BECK | DRILLER: D. CHOATE | DRILLING RIG TYPE: FAILING 1000

DRILLING METHODS: AIR/WET ROTARY | TOTAL DEPTH: 35 FEET | HOLE DIAMETER: 7 7/8"

SITE COORDINATES: 236684.80'N / 791463.31'E | ELEVATIONS: GROUND: N/A | PAD: 2367.71' | TOC: 2370.47' | PROT. CSG: 2370.85'

WATER LEVEL: DEPTH: 8.60 FEET | DATUM: TOC | DATE: 02/22/93 | TIME: 20:10

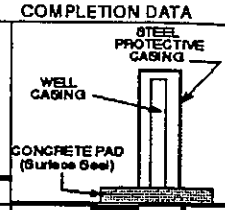
JONES AND NEUSE, INC.
Environmental and Engineering Consultants

LITHOLOGIC DESCRIPTION

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION
0						
	X			SP	SAND	– Uniform, fine grained, loose, brown, moist, no odor.
4	X			SP	SAND	– As above, fine grained, tan, SATURATED slight odor.
5	X			SP	SAND	– As above.
	X					
10	X			SP	SAND	– As above.
11	X			SM	SILTY SAND	– Gap graded, 50% subrounded sand, loose, soft, tan–gray, medium dense, gray–tan, odor.
15	X			SP	SAND	– Uniform, loose, tan, saturated, < 2% GRAVEL.
20	X			GC	SANDY GRAVEL	– Coarse grained, angular, <20% fine SAND, brown to gray, chert, quartz.
24	X			CH	CLAY	– Highly plastic, orange–red, stiff, DOCKUM CLAY @ 24 FEET.
25	X					
	X			CH	CLAY	– As above.
30	X			CH	CLAY	– As above.
35	X			CH	CLAY	– As above.
40						
45						
50						

BORING TERMINATED 35 FEET BELOW GRADE.

COMPLETION DATA



MATERIAL SETTINGS		
0		
5	Cemnt. Bent. Grout	2" Sch 40 PVC Cas.
8		
10	Bent. Seal	> Centr.
14		
15	Filter Pack Sand	0.020" Mill Slot Scrn.
20		
24		
25		> Sand – Point
30		
35		
40		
45		
50		

(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MW-109A.WK3

RECOVERY WELL CONSTRUCTION

WELL NO. RW-112

CLIENT: FINA OIL AND CHEMICAL COMPANY JOB NO: 019505.02 SHEET 1 OF 1

SITE: Big Spring, Texas – South Boundary DATE: START: 14 Sept. 93 FINISH: 14 Sept. 93

GEOLOGIST: James D. Shotwell DRILLER: Choate Well Sevices, Inc. DRILLING RIG TYPE: Failing 1500

DRILLING METHODS: Air Rotary TOTAL DEPTH: 60 feet HOLE DIAMETER: 12.25 inches

SITE COORDINATES: N237781.46 / E791370.45 ELEVATIONS: GROUND: 2385.50 PAD: 2385.54 TOC: 2387.48 PROT. CSG: N/A

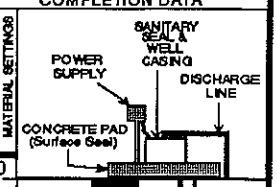
PUMP INFORMATION: TYPE: _____ MODEL: _____ INTAKE LEVEL: _____ Hp GPM

JONES AND NEUSE, INC.
Environmental and Engineering Consultants

LITHOLOGIC DESCRIPTION

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	
0				SP		Sand uniform, fine–very fine grained, loose, red–tan, damp, no odor, 5–10% fines.
10				SP		Sand as above.
				SP		Gravelly Sand uniform, fine–very fine, loose, dry, with 5% Gravel, medium, loose, rounded quartz and caliche , no odor.
20						SATURATION @ 23 FEET
				SC		Clayey Sand very fine, loosely cemented, tan, no odor, 15% fines, saturated.
30				SM		Silty Sand very fine–fine, loose, red–tan, saturated, no odor, 15–20% fines.
				SP		Sand uniform, fine, loose, red–orange, saturated, slight HC odor.
40				SM		Gravelly Silty Sand fine, loose, red, saturated, slight HC odor, 15% rounded quartz
				GP		Sandy Gravel and chert Gravel, 10% Silt. medium–coarse, loose, rounded to angular, quartz, chert, and
				CH		Clay limestone, dark gray, tan and red, saturated. highly plastic, stiff, orange–red, damp.
50				CH		Clay as above.
60				CH		Clay as above.
						Boring Terminated at 60 feet below grade level.
70						
80						
90						
100						

COMPLETION DATA



(1) UNIFIED SOIL CLASSIFICATION SYSTEM

RECOVERY.WK3

MONITOR WELL CONSTRUCTION

WELL NO. MW–125

CLIENT: FINA OIL AND CHEMICAL COMPANY JOB NO: 019505.02 SHEET 1 OF 1

SITE: SOUTH BOUNDARY – PHASE III DATE: START: 30 Nov 93 FINISH: 30 Nov 93

GEOLOGIST: James D. Shotwell DRILLER: Dusty Choate DRILLING RIG TYPE: Failing 1000

DRILLING METHODS: Air Rotary TOTAL DEPTH: 100 feet HOLE DIAMETER: 6.75–inches

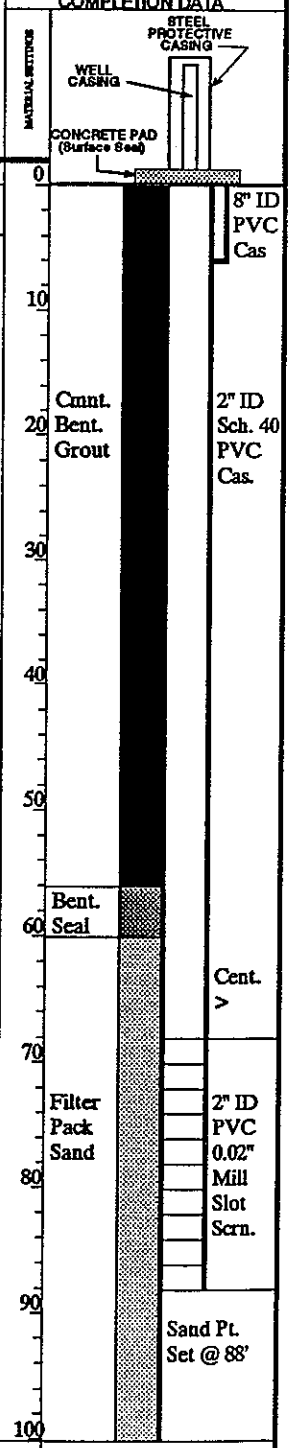
SITE COORDINATES: 238434.65' N and 789189.29' E ELEVATIONS: GROUND: 2437.81' PAD: 2438.31' TOC: 2440.98' PROT. CSG: 2441.36'

WATER LEVEL: DEPTH: 69.59' DATUM: TOC DATE: 3 Dec 93 TIME: 1242

JONES AND NEUSE, INC.
Environmental and Engineering Consultants

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION	
0				Ss		CALICHE	very fine, well cemeted, hard, siliceous and calcareous, white, dry.
				SP		SAND	unifrom, fine, loose, tan–red, dry, no odor.
10				SP		SAND	as above, becoming very fine.
20				SP		SAND	as above.
30				SP		SAND	as above.
40				SP		SAND	as above.
50				SP		SAND	as above.
				SP		SAND	as above, becoming red.
60				SP		SAND	as above, red, no odor.
				SP		SAND	as above, becoming damp.
				SP		SAND	as above, becoming moist.
70							SATURATION @ 69 FEET, no odor.
80				SP		SAND	as above, saturated.
				SP		SAND	as above, slight septic odor.
90				GP		GRAVEL	loose, fine to coarse, various colors, limestone and quartz, saturated, no odor, <2% fines and Sand.
				CH		CLAY	highly plastic, hard, red, damp.
100				CH		CLAY	as above.
							Boring terminated at 100 feet below grade.

COMPLETION DATA



(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MONITOR WELL CONSTRUCTION

WELL NO. MW-125A

CLIENT: FINA OIL AND CHEMICAL COMPANY JOB NO: 019505.02 SHEET 1 OF 1

SITE: SOUTH BOUNDARY – PHASE III DATE: START: 30 Nov 93 FINISH: 30 Nov 93

GEOLOGIST: James D. Shotwell DRILLER: Dusty Choate DRILLING RIG TYPE: Failing 1000

DRILLING METHODS: Air Rotary TOTAL DEPTH: 100 feet HOLE DIAMETER: 6.75–inches

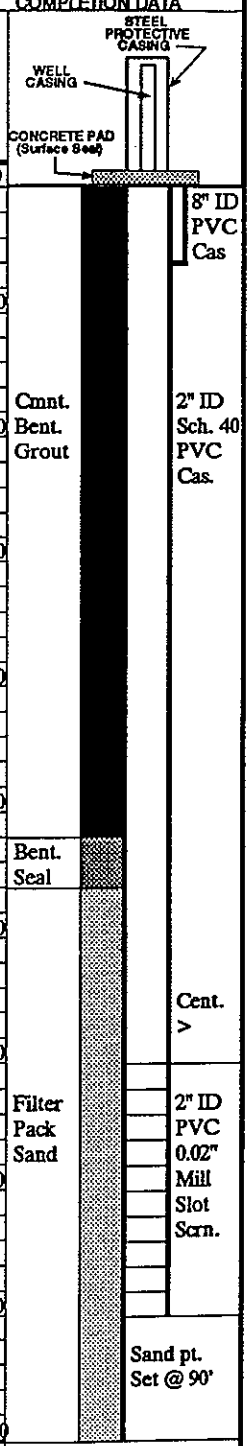
SITE COORDINATES: 238427.68' N and 789195.27' E ELEVATIONS: GROUND: 2437.71' PAD: 2438.21' TOC: 2440.81' PROT. CSG: 2441.22'

WATER LEVEL: DEPTH: 68.78' DATUM: TOC DATE: 3 Dec 93 TIME: 1242

JONES AND NEUSE, INC.
Environmental and Engineering Consultants

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION
0				Ss		CALICHE very fine, well cemeted, hard, siliceous and calcareous, white, dry.
				SP		SAND unifrom, fine, loose, tan–red, dry, no odor.
10				SP		SAND as above, becoming very fine.
20				SP		SAND as above.
30				SP		SAND as above.
40				SP		SAND as above.
50				SP		SAND as above.
				SP		SAND as above, becoming red.
60				SP		SAND as above, red, no odor.
				SP		SAND as above, becoming damp.
				SP		SAND as above, becoming moist.
70						SATURATION @ 69 FEET, no odor.
80				SP		SAND as above, saturated.
				SP		SAND as above, slight septic odor.
90				GP		GRAVEL loose, fine to coarse, various colors, limestone and quartz, saturated, no odor, <2% fines and Sand.
				CH		CLAY highly plastic, hard, red, damp.
100				CH		CLAY as above.
						Boring terminated at 100 feet below grade.

COMPLETION DATA



(1) UNIFIED SOIL CLASSIFICATION SYSTEM

RECOVERY WELL CONSTRUCTION

WELL NO. RW-141

CLIENT: Fina Oil and Chemical Company JOB NO: 019577.1 SHEET 1 OF 1

SITE: Big Spring Refinery DATE: START: 2-17-94 FINISH: 2-17-94

GEOLOGIST: Brad Stokes DRILLER: Choate Well Services DRILLING RIG TYPE: Failing 1000

DRILLING METHODS: Air Rotary TOTAL DEPTH: 80 Feet HOLE DIAMETER: 12.25 Inch

SITE COORDINATES: N 237433.75, E 789813.28 ELEVATIONS: GROUND: NA PAD: 2402.94 TOC: 2406.25 PROT. CSG: NA

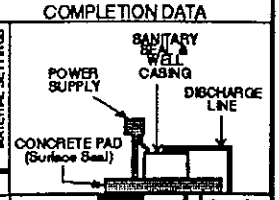
PUMP INFORMATION: TYPE : MODEL : INTAKE LEVEL : Hp GPM

JONES AND NEUSE, INC.
Environmental and Engineering Consultants

LITHOLOGIC DESCRIPTION

DEPTH (FEET)	USCS SYMBOL (1)	LITHOLOGIC DESCRIPTION
0	SM	SILTY SAND –very fine grained quartz sand, subrounded, with 20–30% silt in matrix, dry, compact, light tan color, with occasional caliche nodule.
10	SM	SILTY SAND –similar to above. –becomes reddish tan below 15 feet, with occasional sandstone seam.
20	SM	SILTY SAND –similar to above. –sandstone seam at 25 feet, caliche cement.
30	SM	SILTY SAND –similar to above.
40	SM	–saturated below 39 feet. SILTY SAND –similar to above. –sandstone seam at 45 feet.
50	SM	SILTY SAND –similar to above.
60	GW	SANDY GRAVEL well rounded chert, quartz, and limestone gravel, pebble to cobble sized, coarse to med quartz sand, compact, sat., multicolored.
	CH	SILTY CLAY –moderate plasticity, with 20–25% silt in matrix, stiff, brick-red color, DOCKUM FORMATION.
70	CH	SILTY CLAY –similar to above.
80		BORING TERMINATED AT 80.0 FEET BELOW GRADE
90		
100		

COMPLETION DATA



MATERIAL SETTINGS	
0	Steel Surface Casing
5	Cement & Bent. Grout
20	6 Inch Diam. PVC Casing
22	Bent.
31	8/16 Filter Pack Sand
	6 Inch Diam. 0.020 inch Mill slot PVC Screen
51	PVC Casing
56	PVC Screen
61	
61.5	PVC Cap
	Cave –in
80	

(1) UNIFIED SOIL CLASSIFICATION SYSTEM

REC-SC.WK3

RECOVERY WELL CONSTRUCTION

WELL NO. RW-142

CLIENT: Fina Oil and Chemical Company JOB NO: 019577.1 SHEET 1 OF 2

SITE: Big Spring Refinery DATE: START: 2-16-94 FINISH: 2-16-94

GEOLOGIST: Brad Stokes DRILLER: Choate Well Services DRILLING RIG TYPE: Failing 1000

DRILLING METHODS: Air Rotary TOTAL DEPTH: 110 Feet HOLE DIAMETER: 12.25 Inch

SITE COORDINATES: N 237654.52, E 790806.94 ELEVATIONS: GROUND: NA PAD: 2432.09 TOC: 2436.69 PROT. CSG: NA

PUMP INFORMATION: TYPE : MODEL : INTAKE LEVEL : Hp GPM

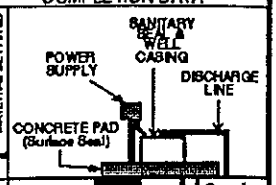
JONES AND NEUSE, INC.
Environmental and Engineering Consultants

LITHOLOGIC DESCRIPTION

DEPTH (FEET)	USCS SYMBOL (1)	LITHOLOGIC DESCRIPTION
0	SM	SILTY SAND –very fine grained quartz sand, with 20–30% silt in matrix, dry, compact to dense, brown color, no odor. –caliche from 3 to 15 feet, white, moderately cemented, hard, gradually diminishes.
10	SM	SILTY SAND –similar to above.
20	SM	SILTY SAND –similar to above, caliche from 20 to 23 feet, hard, white. –light reddish tan color below 23 feet, occasional caliche nodule.
30	SM	SILTY SAND –similar to above.
40	SM	SILTY SAND –similar to above.
50	SM	SILTY SAND –similar to above, reddish tan below 50 feet. –occasional sandstone seams.
60	SM	SILTY SAND –similar to above. –sandstone seam 62–63 feet. –sandstone seam 64–66 feet, saturated below 65 feet, phenolic odor. –calichefied sand below 67 feet.
70	SM	SILTY SAND –similar to above.
80	SM	SILTY SAND –similar to above.
	GW	SANDY GRAVEL well rounded chert, quartz, and limestone gravel, pebble to cobble sized, coarse to medium grained quartz sand, sat., multicolored.
90	CH	SILTY CLAY –moderate to high plasticity, with 10% silt in matrix, stiff, damp, brick–red color, with small inclusions of light gray clay, DOCKUM FORMATION.
100		

(continued on Sheet 2)

COMPLETION DATA



MATERIAL SETTINGS	
0	Steel Surface Casing
5	
	Cement & Bent. Grout
53	
55	Bent.
60	6 Inch Diam. PVC Casing
	6 Inch Diam. 0.020 inch Mill slot PVC Screen
	8/16 Filter Pack Sand
80	PVC Casing
85	PVC Screen
90	PVC Cap
90.5	Cave–in

(1) UNIFIED SOIL CLASSIFICATION SYSTEM

REC–SC.WK3

RECOVERY WELL CONSTRUCTION

WELL NO. RW-142

CLIENT: Fina Oil and Chemical Company JOB NO: 019577.1 SHEET 2 OF 2

SITE: Big Spring Refinery DATE: START: 2-16-94 FINISH: 2-16-94

GEOLOGIST: Brad Stokes DRILLER: Choate Well Services DRILLING RIG TYPE: Failing 1000

DRILLING METHODS: Air Rotary TOTAL DEPTH: 110 Feet HOLE DIAMETER: 12.25 Inch

SITE COORDINATES: N 237654.52, E 790806.94 ELEVATIONS: GROUND: NA PAD: 2432.09 TOC: 2436.69 PROT. CSG: NA

PUMP INFORMATION: TYPE : MODEL : INTAKE LEVEL : Hp GPM

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION (JONES AND NEUSE, INC. Environmental and Engineering Consultants)	COMPLETION DATA: MATERIAL SETTINGS
100							100 CONTINUED FROM SHEET 1
				CH		SILTY CLAY –moderate to high plasticity, with 10% silt in matrix, stiff, damp, brick–red color, with small inclusions of light gray clay, DOCKUM FORMATION.	Cave–in
110							110
						BORING TERMINATED AT 110.0 FEET BELOW GRADE	
120							
130							
140							
150							
160							
170							
180							
190							
200							

(1) UNIFIED SOIL CLASSIFICATION SYSTEM

REC–SC.WK3

RECOVERY WELL CONSTRUCTION

WELL NO. RW-144

CLIENT: Fina Oil and Chemical Company JOB NO: 019577.1 SHEET 1 OF 2

SITE: Big Spring Refinery DATE: START: 2-14-94 FINISH: 2-15-94

GEOLOGIST: Brad Stokes DRILLER: Choate Well Services DRILLING RIG TYPE: Failing 1000

DRILLING METHODS: Air Rotary TOTAL DEPTH: 120 Feet HOLE DIAMETER: 12.25 Inch

SITE COORDINATES: N 238215.72, E 793317.59 ELEVATIONS: GROUND: NA PAD: 2438.49 TOC: 2440.68 PROT. CSG: NA

PUMP INFORMATION: TYPE : MODEL : INTAKE LEVEL : Hp GPM

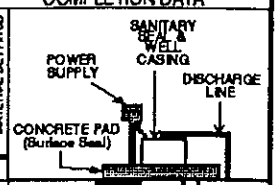
JONES AND NEUSE, INC.
Environmental and Engineering Consultants

LITHOLOGIC DESCRIPTION

DEPTH (FEET)	USCS SYMBOL (1)	STRATIGRAPHY	
0	SM	SILTY SAND	–fine to very fine grained quartz sand, with 20–30% silt in matrix, dry, compact, reddish brown color.
			–caliche from 3 to 10 feet, gradually diminishes.
10			–becomes light reddish tan below 10 feet.
	SM	SILTY SAND	–similar to above.
			–occasional thin seam of moderate to well cemented sandstone.
20	SM	SILTY SAND	–similar to above.
30	SM	SILTY SAND	–similar to above.
40	SM	SILTY SAND	–similar to above.
50			–sandstone seam 48–50 feet
	SM	SILTY SAND	–similar to above.
			–sandstone seam 53–54 feet
60			–sandstone seam at 58 feet
	SM	SILTY SAND	–similar to above.
			–becomes damp below 65 feet
			–sandstone seam 65–66 feet.
70			–sandstone seam 69–70 feet.
	SM	SILTY SAND	–similar to above, saturated below 70 feet, sandstone seam 70–72 feet.
80	GW	SANDY GRAVEL	well rounded chert, quartz, and limestone gravel, pebble to cobble sized, coarse to medium grained quartz sand, saturated, multicolored.
90			
100	CH	SILTY CLAY	–moderate to high plasticity, with 10% silt in matrix, stiff, damp, brick–red color, with small inclusions of light gray clay, DOCKUM FORMATION.

(continued on Sheet 2)

COMPLETION DATA



MATERIAL SETTINGS	
0	Steel Surface Casing
5	
	Cement & Bent. Grout
54	
56	Bent.
62	6 Inch Diam. PVC Casing
	6 Inch Diam. 0.020 inch Mill slot PVC Screen
82	8/16 Filter Pack Sand
87	PVC Casing
	PVC Screen
97	
97.5	PVC Cap
	Cave–in

(1) UNIFIED SOIL CLASSIFICATION SYSTEM

REC–SC.WK3

RECOVERY WELL CONSTRUCTION

WELL NO. RW-144

CLIENT: Fina Oil and Chemical Company JOB NO: 019577.1 SHEET 2 OF 2

SITE: Big Spring Refinery DATE: START: 2-14-94 FINISH: 2-15-94

GEOLOGIST: Brad Stokes DRILLER: Choate Well Services DRILLING RIG TYPE: Failing 1000

DRILLING METHODS: Air Rotary TOTAL DEPTH: 120 Feet HOLE DIAMETER: 12.25 Inch

SITE COORDINATES: N 238215.72, E 793317.59 ELEVATIONS: GROUND: NA PAD: 2438.49 TOC: 2440.68 PROT. CSG: NA

PUMP INFORMATION: TYPE : MODEL : INTAKE LEVEL : Hp GPM

JONES AND NEUSE, INC.
Environmental and Engineering Consultants

LITHOLOGIC DESCRIPTION

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION	COMPLETION DATA: MATERIAL SETTINGS
100							100 CONTINUED FROM SHEET 1
				CH		SILTY CLAY –moderate to high plasticity, with 10% silt in matrix, stiff, damp, brick-red color, with small inclusions of light gray clay, DOCKUM FORMATION.	
110				CH		SILTY CLAY –similar to above.	Cave-in
120							120
						BORING TERMINATED AT 120.0 FEET BELOW GRADE	
130							
140							
150							
160							
170							
180							
190							
200							

(1) UNIFIED SOIL CLASSIFICATION SYSTEM

REC-SC.WK3

RECOVERY WELL CONSTRUCTION

WELL NO. RW-145

CLIENT: Fina Oil and Chemical Company JOB NO: 019577.1 SHEET 1 OF 1

SITE: Big Spring Refinery DATE: START: 2-11-94 FINISH: 2-14-94

GEOLOGIST: Brad Stokes DRILLER: Choate Well Services DRILLING RIG TYPE: Failing 1000

DRILLING METHODS: Air Rotary TOTAL DEPTH: 100 Feet HOLE DIAMETER: 12.25 Inch

SITE COORDINATES: N 238417.18, E 794203.28 ELEVATIONS: GROUND: NA PAD: 2429.48 TOC: 2431.88 PROT. CSG: NA

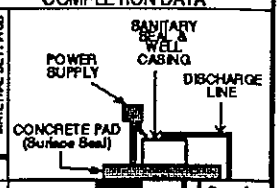
PUMP INFORMATION: TYPE : MODEL : INTAKE LEVEL : Hp GPM

JONES AND NEUSE, INC.
Environmental and Engineering Consultants

LITHOLOGIC DESCRIPTION

DEPTH (FEET)	USCS SYMBOL (1)	STRATIGRAPHY	
0	SM	SILTY SAND	–fine to very fine grained quartz sand, with 15–30% silt in matrix, dry, compact, reddish brown color. –with occasional caliche gravel at 5 feet.
10	SM	SILTY SAND	–similar to above. –becomes light reddish tan below 15 feet.
20	SM	SILTY SAND	–similar to above.
30	SM	SILTY SAND	–sandstone seams 28–33 feet. –similar to above.
40	SM	SILTY SAND	–similar to above.
50	SM	SILTY SAND	–similar to above.
60	SM	SILTY SAND	–becomes damp below 57 feet. –sandstone seam at 58–60 feet. –similar to above, saturated below 60 feet.. –sandstone seam at 63 feet.
70	SM	SILTY SAND	–similar to above.
80	GW	SANDY GRAVEL	well rounded chert, quartz, and limestone gravel, pebble to cobble sized, coarse to medium grained quartz sand, compact, saturated, multicolored.
90	CH	SILTY CLAY	–moderate plasticity, with 20–25% silt in matrix, stiff, brick–red color, DOCKUM FORMATION.
	CH	SILTY CLAY	–similar to above.
100			BORING TERMINATED AT 100.0 FEET BELOW GRADE

COMPLETION DATA



MATERIAL SETTINGS	
0	Steel Surface Casing
5	
	Cement & Bent. Grout
43	Bent.
57	6 Inch Diam. PVC Casing
	8/16 Filter Pack Sand
77	6 Inch Diam. 0.020 inch Mill slot PVC Screen
82	PVC Casing
87	PVC Screen
87.5	PVC Cap
	Cave –in

(1) UNIFIED SOIL CLASSIFICATION SYSTEM

REC–SC.WK3

RECOVERY WELL CONSTRUCTION

WELL NO. RW-146

CLIENT: Fina Oil and Chemical Company JOB NO: 019577.1 SHEET 1 OF 2

SITE: Big Spring Refinery DATE: START: 2-10-94 FINISH: 2-11-94

GEOLOGIST: Brad Stokes DRILLER: Choate Well Services DRILLING RIG TYPE: Failing 1000

DRILLING METHODS: Air Rotary TOTAL DEPTH: 100 Feet HOLE DIAMETER: 12.25 Inch

SITE COORDINATES: N 239130.98, E 794086.69 ELEVATIONS: GROUND: NA PAD: 2438.09 TOC: 2441.48 PROT. CSG: NA

PUMP INFORMATION: TYPE: _____ MODEL: _____ INTAKE LEVEL: _____ ___ Hp ___ GPM

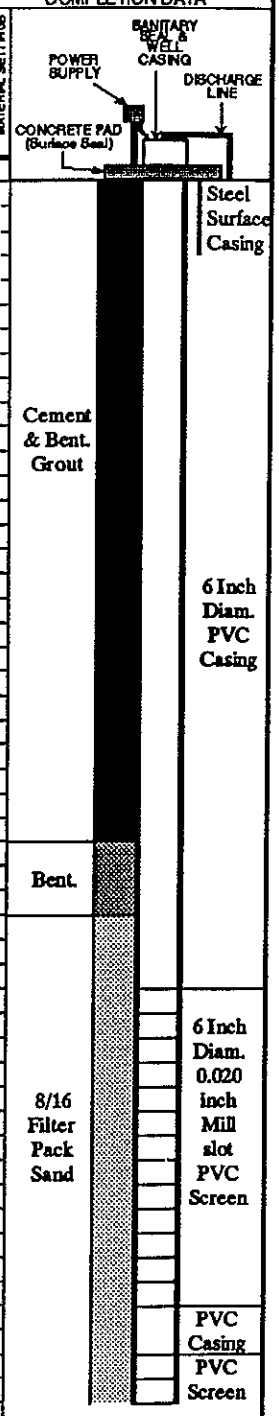
JONES AND NEUSE, INC.
Environmental and Engineering Consultants

LITHOLOGIC DESCRIPTION

DEPTH (FEET)	USCS SYMBOL (1)	LITHOLOGIC DESCRIPTION
0	SM	SILTY SAND –fine to very fine grained quartz sand, with 20% silt in matrix, dry, compact, light reddish tan color. –caliche at 4 feet, gradually diminishes at 10 feet. –occasional sandstone seams
10	SM	SILTY SAND –similar to above.
20	SM	SILTY SAND –similar to above.
30	SM	SILTY SAND –similar to above.
40	SM	SILTY SAND –similar to above.
50	SM	SILTY SAND –similar to above.
60	SM	SILTY SAND –similar to above.
70		–saturated below 68 feet.
	SM	SILTY SAND –similar to above.
80	SM	SILTY SAND –similar to above.
		–red colored sand below 85 feet, "false Red Bed", phenolic odor
90	SM	SILTY SAND –similar to above.
100	GW	SANDY GRAVEL well rounded chert, quartz, and limestone gravel, pebble to cobble sized, coarse to medium grained quartz sand, saturated, compact, multicolored.

(continued on Sheet 2)

COMPLETION DATA



(1) UNIFIED SOIL CLASSIFICATION SYSTEM

REC-SC.WK3

RECOVERY WELL CONSTRUCTION

WELL NO. RW-146

CLIENT: Fina Oil and Chemical Company JOB NO: 019577.1 SHEET 2 OF 2

SITE: Big Spring Refinery DATE: START: 2-10-94 FINISH: 2-11-94

GEOLOGIST: Brad Stokes DRILLER: Choate Well Services DRILLING RIG TYPE: Failing 1000

DRILLING METHODS: Air Rotary TOTAL DEPTH: 120 Feet HOLE DIAMETER: 12.25 Inch

SITE COORDINATES: N 239130.98, E 794086.69 ELEVATIONS: GROUND: NA PAD: 2438.09 TOC: 2441.48 PROT. CSG: NA

PUMP INFORMATION: TYPE : MODEL : INTAKE LEVEL : Hp GPM

JONES AND NEUSE, INC.
Environmental and Engineering Consultants

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION	MATERIAL SETTINGS	COMPLETION DATA
100							100	CONTINUED FROM SHEET 1
				CH		SILTY CLAY –moderate plasticity, with 15–20% silt in matrix, stiff, brick red color, DOCKUM FORMATION. 101.5	101	Filter Sand / Screen / PVC Cap
110				CH		SILTY CLAY –similar to above.		Cave–in
120							120	
						BORING TERMINATED AT 120.0 FEET BELOW GRADE		
130								
140								
150								
160								
170								
180								
190								
200								

(1) UNIFIED SOIL CLASSIFICATION SYSTEM

REC–SC.WK3

RECOVERY WELL CONSTRUCTION

WELL NO. RW-147

CLIENT: Fina Oil and Chemical Company JOB NO: 019577.1 SHEET 1 OF 2

SITE: Big Spring Refinery DATE: START: 2-9-94 FINISH: 2-10-94

GEOLOGIST: Brad Stokes DRILLER: Choate Well Services DRILLING RIG TYPE: Failing 1000

DRILLING METHODS: Air Rotary TOTAL DEPTH: 100 Feet HOLE DIAMETER: 12.25 Inch

SITE COORDINATES: N 239790.45, E 793936.21 ELEVATIONS: GROUND: NA PAD: 2445.56 TOC: 2448.40 PROT. CSG: NA

PUMP INFORMATION: TYPE: MODEL: INTAKE LEVEL: Hp GPM

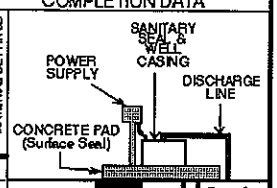
JONES AND NEUSE, INC.
Environmental and Engineering Consultants

LITHOLOGIC DESCRIPTION

DEPTH (FEET)	USCS SYMBOL (1)	STRATIGRAPHY	
0	SM		SILTY SAND –very fine grained quartz sand, with 35% silt in matrix, dry, compact, light reddish tan color.
			–caliche from 4.5 to 8 feet, white, hard, gradually diminishes.
10	SM		SILTY SAND –similar to above.
			–hard caliche from 16 to 17.5 feet.
20	SM		SILTY SAND –similar to above.
30	SM		SILTY SAND –similar to above.
			–sandstone seam at 39 feet.
40	SM		SILTY SAND –similar to above.
			–thin sandstone seams throughout section.
50	SM		SILTY SAND –similar to above.
60	SM		SILTY SAND –similar to above.
70	SM		SILTY SAND –similar to above.
			–saturated below 79 feet.
80	SM		SILTY SAND –similar to above.
			–red colored sand below 85 feet, "false Red Bed", phenolic odor
90	GW		SANDY GRAVEL well rounded chert, quartz, and limestone gravel, pebble to cobble sized, coarse to medium grained quartz sand, saturated, multicolored.
100			

(continued on Sheet 2)

COMPLETION DATA



MATERIAL SETTINGS	
0	Steel Surface Casing
5	
	Cement & Bent. Grout
55	
	6 Inch Diam. PVC Casing
61	Bent.
67	
70	6 Inch Diam. 0.020 inch Mill slot PVC Screen
	8/16 Filter Pack Sand
90	PVC Casing
95	
100	PVC Screen

(1) UNIFIED SOIL CLASSIFICATION SYSTEM

REC-SC.WK3

RECOVERY WELL CONSTRUCTION

WELL NO. RW-147

CLIENT: Fina Oil and Chemical Company JOB NO: 019577.1 SHEET 2 OF 2

SITE: Big Spring Refinery DATE: START: 2-9-94 FINISH: 2-10-94

GEOLOGIST: Brad Stokes DRILLER: Choate Well Services DRILLING RIG TYPE: Failing 1000

DRILLING METHODS: Air Rotary TOTAL DEPTH: 120 Feet HOLE DIAMETER: 12.25 Inch

SITE COORDINATES: N 239790.45, E 793936.21 ELEVATIONS: GROUND: NA PAD: 2445.56 TOC: 2448.40 PROT. CSG: NA

PUMP INFORMATION: TYPE : MODEL : INTAKE LEVEL : Hp GPM

JONES AND NEUSE, INC.
Environmental and Engineering Consultants

LITHOLOGIC DESCRIPTION

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION
100				GW		SANDY GRAVEL well rounded chert, quartz and limestone gravel, pebble to cobble sized, coarse to med grained quartz sand, sat., multicolored
				CH		SILTY CLAY –moderate plasticity, with 20% silt in matrix, firm to stiff, brick red color, damp, DOCKUM FORMATION.
110				CH		SILTY CLAY –similar to above.
120						BORING TERMINATED AT 120.0 FEET BELOW GRADE
130						
140						
150						
160						
170						
180						
190						
200						

100.5

COMPLETION DATA

MATERIAL SETTINGS	
100	CONTINUED FROM SHEET 1
	Sand / PVC Cap
	Cave-in
120	

(1) UNIFIED SOIL CLASSIFICATION SYSTEM

REC-SC.WK3

MONITOR WELL CONSTRUCTION

WELL NO. IW-149

CLIENT: Fina Oil and Chemical Company JOB NO: 019505.02 SHEET 1 OF 2

SITE: Big Spring Refinery DATE: START: 3-15-94 FINISH: 3-15-94

GEOLOGIST: Brad Stokes DRILLER: Choate Well Service DRILLING RIG TYPE: Failing 1000

DRILLING METHODS: Air / Wet Rotary TOTAL DEPTH: 120 Feet HOLE DIAMETER: 6.75 Inch

SITE COORDINATES: N 239410.09, E 794536.76 ELEVATIONS: GROUND: NA PAD: 2437.25 TOC: 2440.17 PROT. CSG: 2440.72

WATER LEVEL: DEPTH: DATUM: DATE: TIME:

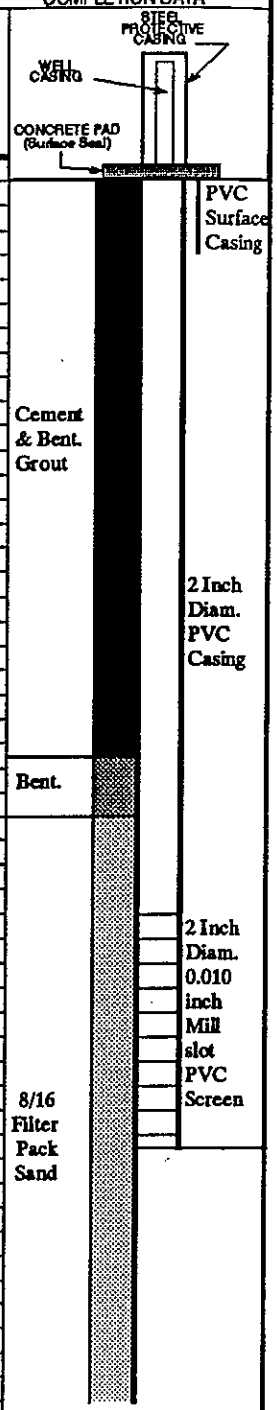
JONES AND NEUSE, INC.
Environmental and Engineering Consultants

LITHOLOGIC DESCRIPTION

DEPTH (FEET)	USCS SYMBOL (1)	LITHOLOGIC DESCRIPTION
0	SM	SILTY SAND –very fine to fine grained quartz sand, with 25 to 35% silt in matrix, dry to damp, compact, brown color, no odor
		–caliche below 4 feet, very light tan to white, lightly cemented to uncemented, dry, gradually diminishes.
10	SM	SILTY SAND –similar to above.
		–reddish brown color below 15 feet
20	SM	SILTY SAND –similar to above
30	SM	SILTY SAND –similar to above.
40	SM	SILTY SAND –similar to above.
50	SM	SILTY SAND –similar to above.
60	SM	SILTY SAND –similar to above, except saturated below 60 feet, phenolic odor
		–with occasional sandstone seams below 65 feet
70	SM	SILTY SAND –similar to above.
80	SM	SILTY SAND –similar to above.
90	GW	SANDY GRAVEL well rounded, pebble to cobble sized, quartz, chert and limestone gravel, with 30% coarse to medium quartz sand, compact, multicolored, saturated
100	CH	SILTY CLAY –moderate to high plasticity, firm to stiff, with 15 to 25% silt in matrix, brick red color, with occassional inclusion of light gray clay, DOCKUM FM.

(continued on Sheet 2)

COMPLETION DATA



(1) UNIFIED SOIL CLASSIFICATION SYSTEM

REC-SC.WK3

MONITOR WELL CONSTRUCTION

WELL NO. IW-149

CLIENT: Fina Oil and Chemical Company JOB NO: 019505.02 SHEET 2 OF 2

SITE: Big Spring Refinery DATE: START: 3-15-94 FINISH: 3-15-94

GEOLOGIST: Brad Stokes DRILLER: Choate Well Service DRILLING RIG TYPE: Failing 1000

DRILLING METHODS: Air / Wet Rotary TOTAL DEPTH: 120 Feet HOLE DIAMETER: 6.75 Inch

SITE COORDINATES: N 239410.09, E 794536.76 ELEVATIONS: GROUND: NA PAD: 2437.25 TOC: 2440.17 PROT. CSG: 2440.72

WATER LEVEL: DEPTH: DATUM: DATE: TIME:

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION	MATERIAL SETTINGS	COMPLETION DATA
100				CH		SILTY CLAY –similar to above		BELOW GRADE MATERIAL COMPLETIONS CONTINUED FROM PREVIOUS PAGE
110								
120							120	
						BORING TERMINATED AT 120.0 FEET BELOW GRADE		
130								
140								
150								
160								
170								
180								
190								
200								

JONES AND NEUSE, INC. Environmental and Engineering Consultants

(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MW-P2-SC.WK3

MONITOR WELL CONSTRUCTION

WELL NO. IW-149A

CLIENT: Fina Oil and Chemical Company JOB NO: 019505.02 SHEET 1 OF 2

SITE: Big Spring Refinery DATE: START: 3-17-94 FINISH: 3-17-94

GEOLOGIST: Brad Stokes DRILLER: Choate Well Service DRILLING RIG TYPE: Failing 1000

DRILLING METHODS: Air / Wet Rotary TOTAL DEPTH: 110 Feet HOLE DIAMETER: 6.75 Inch

SITE COORDINATES: N 239422.04, E 794537.69 ELEVATIONS: GROUND: NA PAD: 2437.24 TOC: 2440.23 PROT. CSG: 2440.78

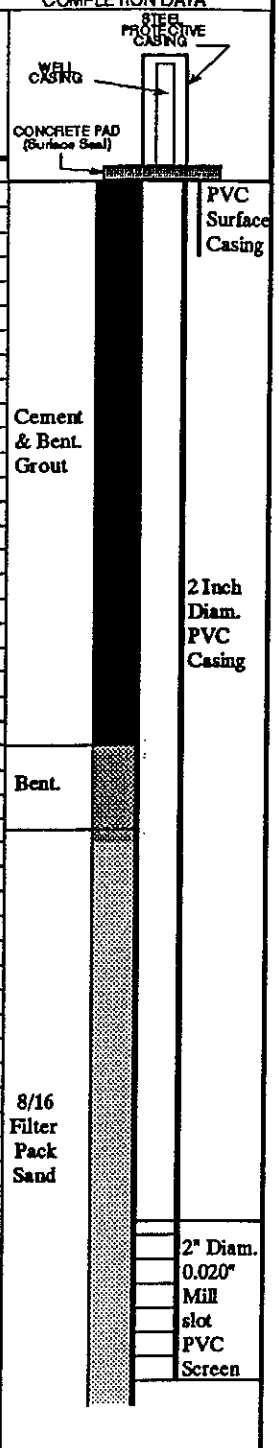
WATER LEVEL: DEPTH: DATUM: DATE: TIME:

JONES AND NEUSE, INC.
Environmental and Engineering Consultants

LITHOLOGIC DESCRIPTION

DEPTH (FEET)	USCS SYMBOL (1)	LITHOLOGIC DESCRIPTION
0	SM	SILTY SAND –very fine to fine grained quartz sand, with 25 to 35% silt in matrix, dry to slightly damp, compact, brown color, no odor
		–caliche below 4 feet, very light tan to white, lightly cemented to uncemented, dry, gradually diminishes to 10 feet
10	SM	SILTY SAND –similar to above.
		–light reddish tan color below 15 feet
20	SM	SILTY SAND –similar to above
30	SM	SILTY SAND –similar to above.
40	SM	SILTY SAND –similar to above.
50	SM	SILTY SAND –similar to above.
60	SM	SILTY SAND –similar to above, except saturated below 60 feet, phenolic odor
70	SM	SILTY SAND –similar to above.
80	SM	SILTY SAND –similar to above.
		–brick red sand and sandstone below 82 feet, "false Red–Bed"
90	GW	SANDY GRAVEL well rounded, pebble to cobble sized, quartz, chert and limestone gravel, with 15 to 30% coarse to medium quartz sand, compact, multicolored, saturated
100	CH	SILTY CLAY –moderate to high plasticity, firm to stiff, with 15 to 25% silt in matrix, brick red color, with occassional inclusion of light gray clay, DOCKUM FM.

(continued on Sheet 2)



(1) UNIFIED SOIL CLASSIFICATION SYSTEM

REC-BC.WK3

MONITOR WELL CONSTRUCTION

WELL NO. IW-149A

CLIENT: Fina Oil and Chemical Company JOB NO: 019505.02 SHEET 2 OF 2

SITE: Big Spring Refinery DATE: START: 3-17-94 FINISH: 3-17-94

GEOLOGIST: Brad Stokes DRILLER: Choate Well Service DRILLING RIG TYPE: Failing 1000

DRILLING METHODS: Air / Wet Rotary TOTAL DEPTH: 110 Feet HOLE DIAMETER: 6.75 Inch

SITE COORDINATES: N 239422.04, E 794537.69 ELEVATIONS: GROUND: NA PAD: 2437.24 TOC: 2440.23 PROT. CSG: 2440.78

WATER LEVEL: DEPTH: DATUM: DATE: TIME:

JONES AND NEUSE, INC.
Environmental and Engineering Consultants

LITHOLOGIC DESCRIPTION

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION
100				CH		SILTY CLAY –similar to above
110						BORING TERMINATED AT 110.0 FEET BELOW GRADE
120						
130						
140						
150						
160						
170						
180						
190						
200						

COMPLETION DATA

MATERIAL SETTINGS

BELOW GRADE MATERIAL COMPLETIONS CONTINUED FROM PREVIOUS PAGE

(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MW-P2-SC.WK3

MONITOR WELL CONSTRUCTION

WELL NO. IW-150

CLIENT: Fina Oil and Chemical Company JOB NO: 019505.02 SHEET 1 OF 1

SITE: Big Spring Refinery DATE: START: 3-16-94 FINISH: 3-16-94

GEOLOGIST: Brad Stokes DRILLER: Choate Well Service DRILLING RIG TYPE: Failing 1000

DRILLING METHODS: Air Rotary TOTAL DEPTH: 60 Feet HOLE DIAMETER: 6.75 Inch

SITE COORDINATES: N 236496.47, E 794259.34 ELEVATIONS: GROUND: NA PAD: 2391.84 TOC: 2394.79 PROT. CSG: 2395.34

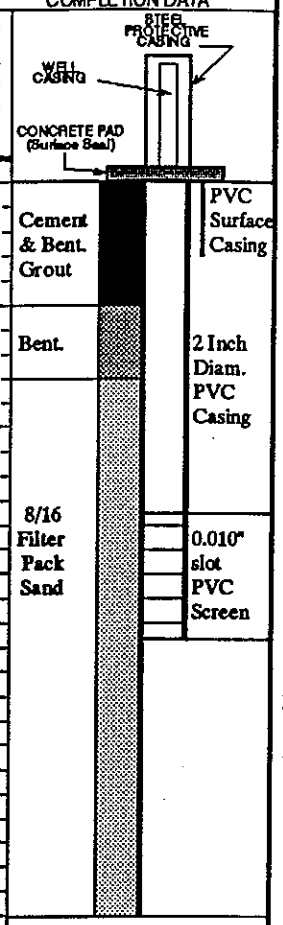
WATER LEVEL: DEPTH: DATUM: DATE: TIME:

JONES AND NEUSE, INC.
Environmental and Engineering Consultants

LITHOLOGIC DESCRIPTION

DEPTH (FEET)	USCS SYMBOL (1)	LITHOLOGIC DESCRIPTION
0	SM	**SILTY SAND** –very fine grained quartz sand, with 25 to 35% silt in matrix, dry compact to loose, light tan color, some caliche gravel, no odor
10	SM	**SILTY SAND** –similar to above.
20	SM	–becomes brick–red colored below 18 feet **SILTY SAND** –similar to above, with occassional sandstone seam below 20 feet
30	SM	**SILTY SAND** –saturated below 28 feet, sand becomes fine to medium grained rounded quartz, with 15% silt, tan color, phenolic odor
37		–hard sandstone at 37 feet
40	GW	**SANDY GRAVEL** well rounded quartz, chert and limestone gravel, granule to cobble sized, with 25 to 30% silty sand in matrix, compact
50	CH	**SILTY CLAY** –moderate to high plasticity, with 15 to 25% silt in matrix, brick–red color, firm to stiff, DOCKUM FM.
60		**BORING TERMINATED AT 60.0 FEET BELOW GRADE**
70		
80		
90		
100		

COMPLETION DATA



(1) UNIFIED SOIL CLASSIFICATION SYSTEM

REC–SC.WK3

MONITOR WELL CONSTRUCTION

WELL NO. IW-150A

CLIENT: Fina Oil and Chemical Company JOB NO: 019505.02 SHEET 1 OF 1

SITE: Big Spring Refinery DATE: START: 3-18-94 FINISH: 3-18-94

GEOLOGIST: Brad Stokes DRILLER: Choate Well Service DRILLING RIG TYPE: Failing 1000

DRILLING METHODS: Air Rotary TOTAL DEPTH: 60 Feet HOLE DIAMETER: 6.75 Inch

SITE COORDINATES: N 236473.16, E 794262.68 ELEVATIONS: GROUND: NA PAD: 2391.84 TOC: 2394.83 PROT. CSG: 2395.40

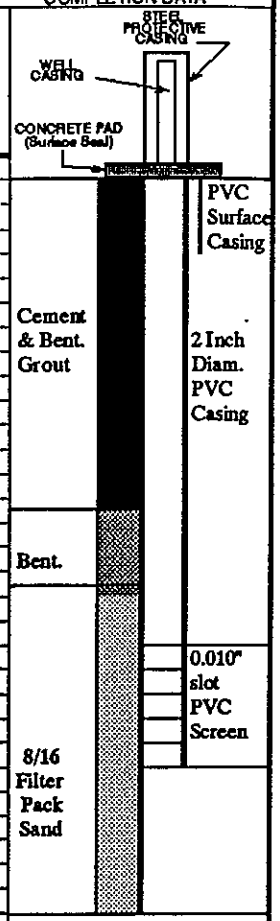
WATER LEVEL: DEPTH: DATUM: DATE: TIME:

JONES AND NEUSE, INC.
Environmental and Engineering Consultants

LITHOLOGIC DESCRIPTION

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION
0				SM		SILTY SAND –very fine grained quartz sand, with 25 to 35% silt in matrix, dry compact to loose, light tan color, some caliche gravel, no odor
10				SM		SILTY SAND –similar to above.
20				SM		–becomes brick–red colored below 18 feet SILTY SAND –similar to above, with occassional sandstone seam below 20 feet
30				SM		SILTY SAND –saturated below 28 feet, sand becomes fine to medium grained rounded quartz, with 15% silt, tan color, phenolic odor
40				GW		–hard sandstone at 37 feet SANDY GRAVEL well rounded quartz, chert and limestone gravel, granule to cobble sized, with 25 to 30% silty sand in matrix, compact
50				CH		–dark brown silty seam at 46 feet SILTY CLAY –moderate to high plasticity, with 15 to 25% silt in matrix, brick–red color, firm to stiff, DOCKUM FM.
60						BORING TERMINATED AT 60.0 FEET BELOW GRADE
70						
80						
90						
100						

COMPLETION DATA



(1) UNIFIED SOIL CLASSIFICATION SYSTEM

REC-SC.WK3

MONITOR WELL CONSTRUCTION

JONES & NEUSE
GULF COAST REGION OF RMT

WELL NO. MW-152

CLIENT: FINA OIL AND CHEMICAL COMPANY JOB NO: 019505.02 SHEET 1 OF 2

SITE: BIG SPRING, TEXAS DATE: START: 1145 June 22, 1994 FINISH: 1230 June 22, 1994

GEOLOGIST: James D. Shotwell DRILLER: Dusty Choate DRILLING RIG TYPE: Failing 1500

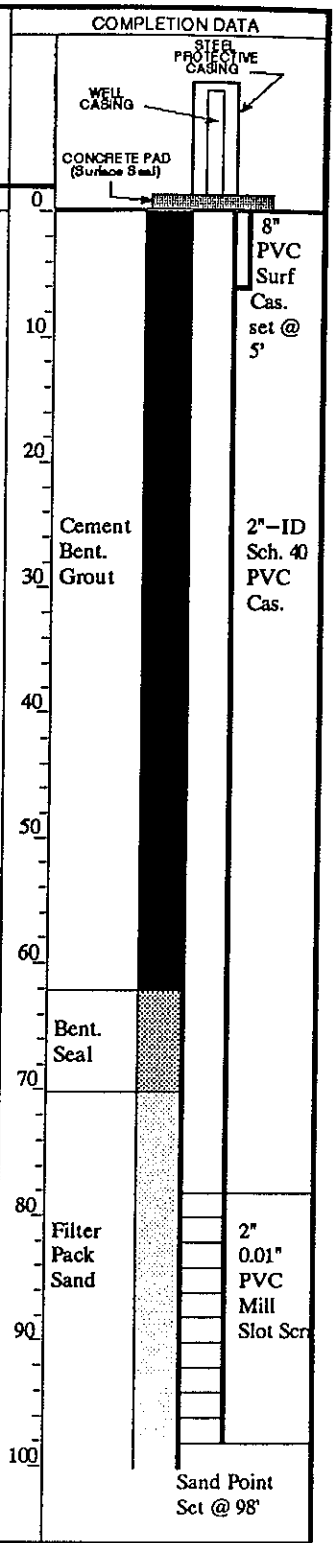
DRILLING METHODS: Air Rotary TOTAL DEPTH: 115 feet HOLE DIAMETER: 6.75 inches

SITE COORDINATES: 242601.34' N + 787822.22' E ELEVATIONS: GROUND: 2472.81 PAD: 2473.41 TOC: 2475.86 PROT. CSG: 2476.49

WATER LEVEL: DEPTH: DATUM: DATE: TIME:

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION
0				SP		SAND uniform, fine, loose, red, dry, no odor.
10				SP		SAND uniform, fine, loose, red, dry, no odor.
20				SP		SAND uniform, fine, loose, red, dry, no odor.
30				SP		SAND uniform, fine, loose, red, dry, no odor.
40				SP		SAND uniform, fine, loose, red, dry, no odor.
50				SP		SAND uniform, fine, loose, red, dry, no odor, with <5% calc. & silic. Gravel.
				SP		SAND uniform, fine, loose, red, dry, no odor, with <5% calc. & silic. Gravel.
				SP		SAND uniform, fine, loose, red, dry, no odor.
60				SP		SAND uniform, fine, loose, red, dry, no odor.
70				SP		SAND uniform, fine, loose, red, becoming damp, no odor.
80						SATURATION @ 79 feet below grade. slight odor.
				SP		SAND uniform, fine, loose, red, saturated, no odor,
90				SP		SAND uniform, fine, loose, red, saturated, no odor,
100						

(Continued on Page 2)



(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MONITOR WELL CONSTRUCTION

JONES & NEUSE
GULF COAST REGION OF RMT

WELL NO. MW-152

CLIENT: FINA OIL AND CHEMICAL COMPANY JOB NO: 019505.02 SHEET 2 OF 2

SITE: BIG SPRING, TEXAS DATE: START: 1145 June 22, 1994 FINISH: 1230 June 22, 1994

GEOLOGIST: James D. Shotwell DRILLER: Dusty Choate DRILLING RIG TYPE: Failing 1500

DRILLING METHODS: Air Rotary TOTAL DEPTH: 115 feet HOLE DIAMETER: 6.75 inches

SITE COORDINATES: 242601.34' N + 787822.22' E ELEVATIONS: GROUND: 2472.81 PAD: 2473.41 TOC: 2475.86 PROT. CSG: 2476.49

WATER LEVEL: DEPTH: DATUM: DATE: TIME:

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION	COMPLETION DATA: MATERIAL SETTINGS	COMPLETION DATA: BELOW GRADE MATERIAL COMPLETIONS CONTINUED FROM PREVIOUS PAGE
100							100	
				SP		SAND unifrom, fine, loose, red, saturated, slight odor.		
				SP		GRASVELLY SAND uniform, fine to very fine, loose, saturated with 25% fine Gravel, quartz, limestone and shell fragments, various colors, no odor.		Filter Pack Sand
110				GP		SANDY GRAVEL fine, loose, quartz, limestone, and shell fragments various colors with 10% fine Sand, no odor.	110	
120						Boring Terminated @ 115 Feet Below Grade	120	
130							130	
140							140	
150							150	
160							160	
170							170	
180							180	
190							190	
200							200	

(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MONITOR WELL CONSTRUCTION

JONES & NEUSE
GULF COAST REGION OF RMT

WELL NO. MW-152A

CLIENT: FINA OIL AND CHEMICAL COMPANY JOB NO: 019505.02 SHEET 1 OF 2

SITE: BIG SPRING, TEXAS DATE: START: 1605 June 21, 1994 FINISH: 0925 June 22, 1994

GEOLOGIST: James D. Shotwell DRILLER: Dusty Choate DRILLING RIG TYPE: Failing 1500

DRILLING METHODS: Air Rotary TOTAL DEPTH: 135 feet HOLE DIAMETER: 6.75 inches

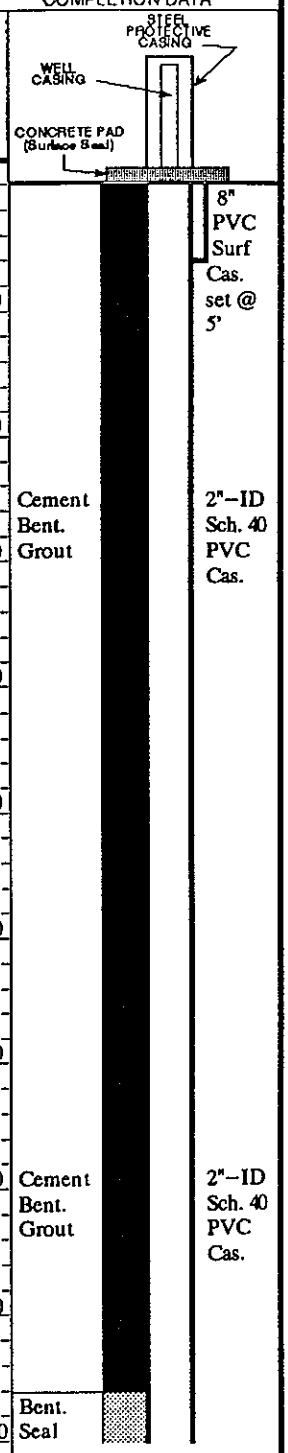
SITE COORDINATES: 242600.51' N + 787811.18' E ELEVATIONS: GROUND: 2472.80 PAD: 2473.40 TOC: 2475.86 PROT. CSG: 2476.49

WATER LEVEL: DEPTH: DATUM: DATE: TIME:

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION
0						
				SP		SAND uniform, fine, loose, red, dry, no odor.
10				SP		SAND uniform, fine, loose, red, dry, no odor.
20				SP		SAND uniform, fine, loose, red, dry, no odor.
30				SP		SAND uniform, fine, loose, red, dry, no odor.
40				SP		SAND uniform, fine, loose, red, dry, no odor.
50				SP		SAND uniform, fine, loose, red, dry, no odor, with <5% calc. & silic. Gravel.
				SP		SAND uniform, fine, loose, red, dry, no odor, with <5% calc. & silic. Gravel.
				SP		SAND uniform, fine, loose, red, dry, no odor.
60				SP		SAND uniform, fine, loose, red, dry, no odor.
70				SP		SAND uniform, fine, loose, red, becoming damp, no odor.
80						SATURATION @ 79 feet below grade. slight odor.
				SP		SAND uniform, fine, loose, red, saturated, no odor,
90				SP		SAND uniform, fine, loose, red, saturated, no odor,
100						

(Continued on Page 2)

COMPLETION DATA



(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MONITOR WELL CONSTRUCTION

JONES & NEUSE
GULF COAST REGION OF AMT

WELL NO. MW-152A
CLIENT: FINA OIL AND CHEMICAL COMPANY JOB NO: 019505.02 SHEET 2 OF 2
SITE: BIG SPRING, TEXAS DATE: START: 1605 June 21, 1994 FINISH: 0925 June 22, 1994
GEOLOGIST: James D. Shotwell DRILLER: Dusty Choate DRILLING RIG TYPE: Failing 1500
DRILLING METHODS: Air Rotary TOTAL DEPTH: 135 feet HOLE DIAMETER: 6.75 inches
SITE COORDINATES: 242600.51' N + 787811.18' E ELEVATIONS: GROUND: 2473.80 PAD: 2473.40 TOC: 2475.86 PROT. CSG: 2476.49
WATER LEVEL: DEPTH: DATUM: DATE: TIME:

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION
100				SP		SAND unifrom, fine, loose, red, saturated, slight odor.
				SP		GRASVELLY SAND uniform, fine to very fine, loose, saturated with 25% fine Gravel, quartz, limestone and shell fragments, various colors, no odor.
110				GP		SANDY GRAVEL fine, loose, quartz, limestone, and shell fragments various colors with 10% fine Sand, no odor.
				CH		CLAY highly plastic, hard, red-orange, damp.
120				CH		CLAY highly plastic, hard, red-orange, damp.
130				CH		CLAY highly plastic, hard, red-orange, damp.
				CH		CLAY highly plastic, hard, red-orange, damp.
140						Boring Terminated @ 135 Feet Below Grade
150						
160						
170						
180						
190						
200						

COMPLETION DATA

MATERIAL SETTINGS	BELOW GRADE MATERIAL COMPLETIONS CONTINUED FROM PREVIOUS PAGE
100	Bent. Seal
110	Filter Pack Sand
120	2 inch 0.01" Mill Slot PVC Scrn.
130	
140	Sand Point Set @ 116'
150	
160	
170	
180	
190	
200	

(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MONITOR WELL CONSTRUCTION

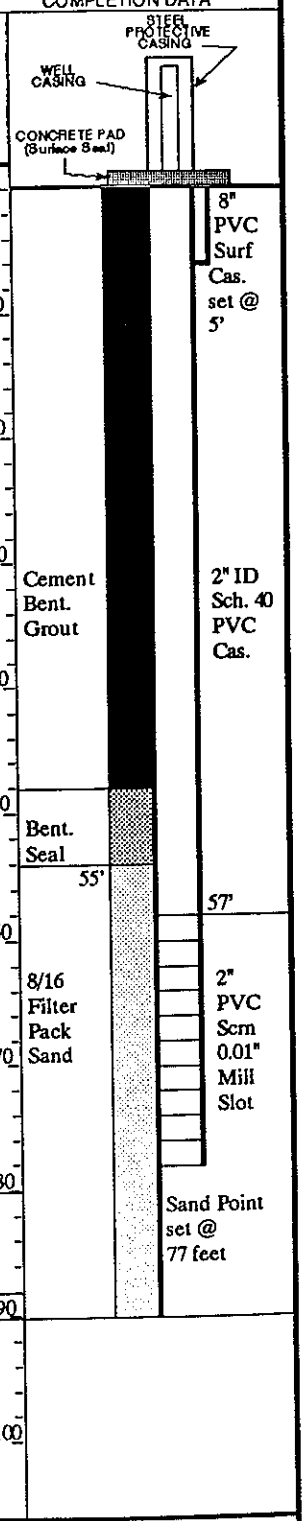
JONES & NEUSE
GULF COAST REGION OF RMT

WELL NO. MW-153
SHEET 1 OF 1

CLIENT: FINA OIL AND CHEMICAL COMPANY
JOB NO: 019505.02
SITE: BIG SPRING, TEXAS
DATE: START: 0910 June 23, 1994 FINISH: 0955 June 23, 1994
GEOLOGIST: James D. Shotwell
DRILLER: Dusty Choate
DRILLING RIG TYPE: Failing 1500
DRILLING METHODS: Air Rotary
TOTAL DEPTH: 90 feet
HOLE DIAMETER: 6.75 – inches
SITE COORDINATES: 242417.73' N + 786548.60' E
ELEVATIONS: GROUND: 2453.08 PAD: 2453.58 TOC: 2456.19 PROT. CSG: 2456.73
WATER LEVEL: DEPTH: DATUM: DATE: TIME:

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION
0				SP		SAND uniform, fine to very fine, loose, red, dry.
10				SP		SAND uniform, fine to very fine, loose, red, dry.
20				SP		SAND uniform, fine to very fine, loose, red, dry.
30				SP		SAND uniform, fine to very fine, loose, red, dry.
40				SP		SAND uniform, fine to very fine, loose, red, dry.
50				SP		SAND uniform, fine to very fine, loose, red, dry.
				SP		SAND uniform, fine to very fine, loose, red, becoming damp.
60						SATURATION @ 58 feet below grade, no odor.
				SP		SAND as above, saturated.
70				SP		SAND as above.
80				GP		SANDY GRAVEL uniform, fine, loose, quartz, limestone, ans shell fragments, various colors, no odor with 5% very fine Sand.
90		87'		CH		CLAY (@87') highly plastic, hard, red–orange, damp.
						Boring terminated at 90 feet below grade.
100						

COMPLETION DATA



(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MW-ST-SC.WK3

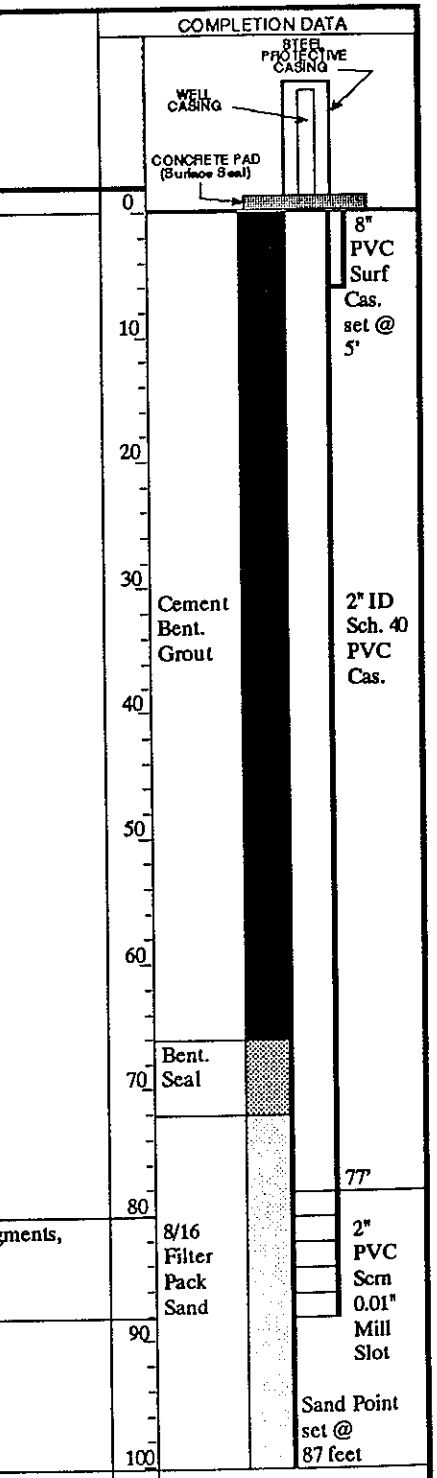
MONITOR WELL CONSTRUCTION

JONES & NEUSE
GULF COAST REGION OF RMT

WELL NO. MW-153A
SHEET 1 OF 1

CLIENT: FINA OIL AND CHEMICAL COMPANY
JOB NO: 019505.02
SITE: BIG SPRING, TEXAS
DATE: START: 1515 June 22, 1994 FINISH: 1605 June 22, 1994
GEOLOGIST: James D. Shotwell
DRILLER: Dusty Choate
DRILLING RIG TYPE: Failing 1500
DRILLING METHODS: Air Rotary
TOTAL DEPTH: 100 feet
HOLE DIAMETER: 6.75 – inches
SITE COORDINATES: 242.415.04' N + 786535.93' E
ELEVATIONS: GROUND: 2453.35 PAD: 2453.85 TOC: 2456.34 PROT. CSG: 2456.97
WATER LEVEL: DEPTH: DATUM: DATE: TIME:

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION
0				SP		SAND uniform, fine to very fine, loose, red, dry.
10				SP		SAND uniform, fine to very fine, loose, red, dry.
20				SP		SAND uniform, fine to very fine, loose, red, dry.
30				SP		SAND uniform, fine to very fine, loose, red, dry.
40				SP		SAND uniform, fine to very fine, loose, red, dry.
50				SP		SAND uniform, fine to very fine, loose, red, dry.
				SP		SAND uniform, fine to very fine, loose, red, becoming damp.
60						SATURATION @ 58 feet below grade, no odor.
				SP		SAND as above, saturated.
70				SP		SAND as above.
80				GP		SANDY GRAVEL uniform, fine, loose, quartz, limestone, ans shell fragments, various colors, no odor with 5% very fine Sand.
90		87'		CH		CLAY (@87') highly plastic, hard, red–orange, damp.
100				CH		CLAY as above.
						Boring terminated at 100 feet below grade.



(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MONITOR WELL CONSTRUCTION

JONES & NEUSE
GULF COAST REGION OF RMT

WELL NO. MW-154

CLIENT: FINA OIL AND CHEMICAL COMPANY JOB NO: 019505.02 SHEET 1 OF 2

SITE: BIG SPRING, TEXAS DATE: START: 1245 June 20, 1994 FINISH: 1435 June 20, 1994

GEOLOGIST: James D. Shotwell DRILLER: Dusty Choate DRILLING RIG TYPE: Failing 1500

DRILLING METHODS: Air Rotary TOTAL DEPTH: 120 feet HOLE DIAMETER: 6.75 – inches

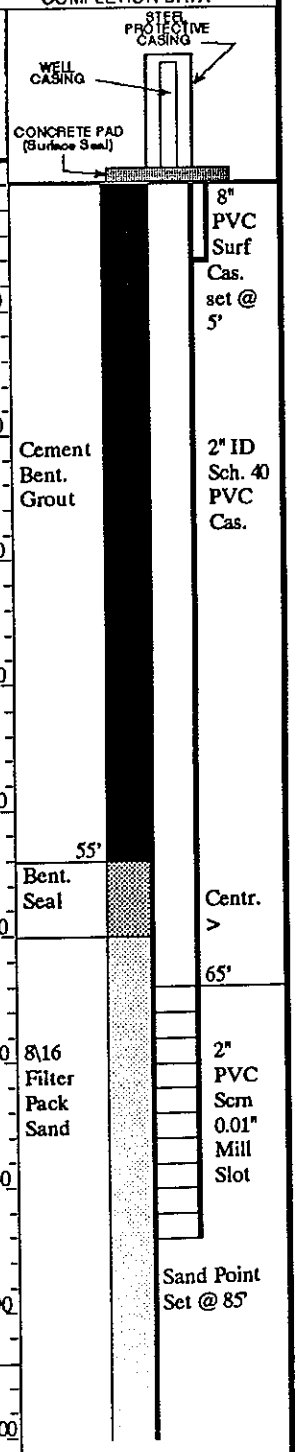
SITE COORDINATES: 240331.22' N + 787129.99' E ELEVATIONS: GROUND: 2448.60 PAD: 2449.10 TOC: 2451.56 PROT. CSG: 2452.19

WATER LEVEL: DEPTH: DATUM: DATE: TIME:

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION
0				SP		SAND uniform, fine, loose, red, dry, no odor, with <5% white caliche gravel.
10				SP		SAND as above, no gravel.
20				SP		SAND as above.
30				SP		SAND as above.
40				SP		SAND as above.
50				SP		SAND as above.
60				SP		SAND as above.
						SATURATION @ 66 feet below grade, odor.
70				SP		SAND as above, saturated, odor.
80				SP		SAND as above
90				SP		SAND as above, lightly cemented.
				GP		SANDY GRAVEL loose, gap graded, chert, limestone, quartz, various colors, saturated with strong gasoline odor.
100						

(Continued on Page 2)

COMPLETION DATA



(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MONITOR WELL CONSTRUCTION

JONES & NEUSE GULF COAST REGION OF RMT

WELL NO. MW-154

CLIENT: FINA OIL AND CHEMICAL COMPANY JOB NO: 019505.02 SHEET 2 OF 2

SITE: BIG SPRING, TEXAS DATE: START: 1245 June 20, 1994 FINISH: 1435 June 20, 1994

GEOLOGIST: James D. Shotwell DRILLER: Dusty Choate DRILLING RIG TYPE: Failing 1500

DRILLING METHODS: Air Rotary TOTAL DEPTH: 120 feet HOLE DIAMETER: 6.75 inches

SITE COORDINATES: 240331.22' N + 787129.99' E ELEVATIONS: GROUND: 2448.60 PAD: 2449.10 TOC: 2451.56 PROT. CSG: 2452.19

WATER LEVEL: DEPTH: DATUM: DATE: TIME:

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION	COMPLETION DATA: MATERIAL SETTINGS	COMPLETION DATA: BELOW GRADE MATERIAL COMPLETIONS CONTINUED FROM PREVIOUS PAGE
100							100	
				GP		SANDY GRAVEL as above.		
				CH		CLAY highly plastic, hard, orange-red, damp.		8\16 Filter Pack Sand
110				CH		CLAY as above.	110	
120				CH		CLAY as above.	120	
						Boring terminated @ 120 feet below grade.		
130							130	
140							140	
150							150	
160							160	
170							170	
180							180	
190							190	
200							200	

(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MW-PG2.WK3

MONITOR WELL CONSTRUCTION

JONES & NEUSE
GULF COAST REGION OF RMT

WELL NO. MW-154A

CLIENT: FINA OIL AND CHEMICAL COMPANY JOB NO: 019505.02 SHEET 1 OF 2

SITE: BIG SPRING, TEXAS DATE: START: 1239 June 21, 1994 FINISH: 1410 June 21, 1994

GEOLOGIST: James D. Shotwell DRILLER: Dusty Choate DRILLING RIG TYPE: Failing 1500

DRILLING METHODS: Air Rotary TOTAL DEPTH: 120 feet HOLE DIAMETER: 6.75 – inches

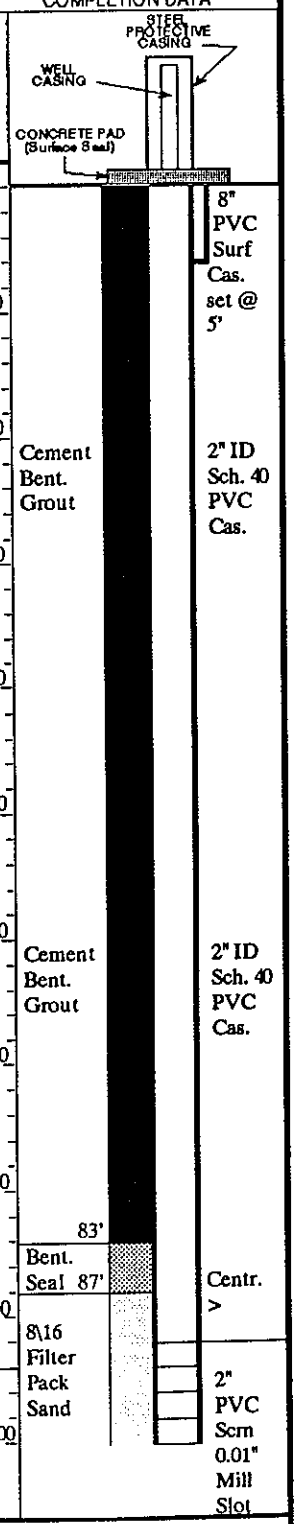
SITE COORDINATES: 240341.22' N + 787129.83' E ELEVATIONS: GROUND: 2448.61 PAD: 2449.11 TOC: 2451.58 PROT. CSG: 2452.21

WATER LEVEL: DEPTH: DATUM: DATE: TIME:

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION
0				SP		SAND uniform, fine, loose, red, dry, no odor, with <5% white caliche gravel.
10				SP		SAND as above, no gravel.
20				SP		SAND as above.
30				SP		SAND as above.
40				SP		SAND as above.
50				SP		SAND as above.
60				SP		SAND as above.
						SATURATION @ 66 feet below grade, odor.
70				SP		SAND as above, saturated, odor.
80				SP		SAND as above
90				SP		SAND as above, lightly cemented.
100				GP		SANDY GRAVEL loose, gap graded, chert, limestone, quartz, various colors, saturated with strong gasoline odor.

(Continued on Page 2)

COMPLETION DATA



(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MONITOR WELL CONSTRUCTION

JONES & NEUSE
GULF COAST REGION OF RMT

WELL NO. MW-154A
SHEET 2 OF 2

CLIENT: FINA OIL AND CHEMICAL COMPANY
JOB NO: 019505.02
SITE: BIG SPRING, TEXAS
DATE: START: 1239 June 21, 1994 FINISH: 1410 June 21, 1994
GEOLOGIST: James D. Shotwell
DRILLER: Dusty Choate
DRILLING RIG TYPE: Failing 1500
DRILLING METHODS: Air Rotary
TOTAL DEPTH: 120 feet
HOLE DIAMETER: 6.75 inches
SITE COORDINATES: 240341.22' N + 787129.83' E
ELEVATIONS: GROUND: 2448.61 PAD: 2449.11 TOC: 2451.58 PROT. CSG: 2452.21
WATER LEVEL: DEPTH: DATUM: DATE: TIME:

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION
100				GP		SANDY GRAVEL as above.
				CH		CLAY highly plastic, hard, orange-red, damp.
110				CH		CLAY as above.
120				CH		CLAY as above.
						Boring terminated @ 120 feet below grade.

COMPLETION DATA

MATERIAL SETTINGS	BELOW GRADE MATERIAL COMPLETIONS CONTINUED FROM PREVIOUS PAGE
100	
110	8\16 Filter Pack Sand
120	Sand Point set @ 102'

(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MW-PG2.WK3

MONITOR WELL CONSTRUCTION

JONES & NEUSE
GULF COAST REGION OF RMT

WELL NO. MW-155

CLIENT: Fina Oil and Chemical JOB NO: 50-00195.05.002 SHEET 1 OF 1

SITE: Big Spring Refinery DATE: START: 10/20/94 FINISH: 10/20/94

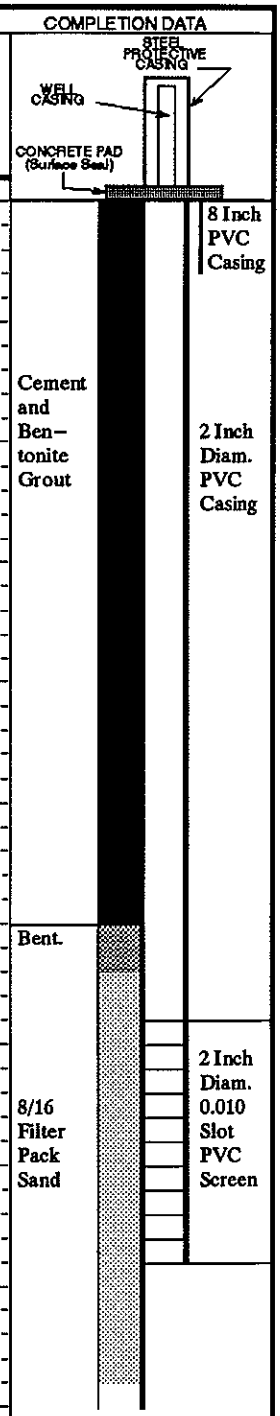
GEOLOGIST: Brad Stokes DRILLER: Choate Well Service DRILLING RIG TYPE: Failing 1000

DRILLING METHODS: Air / Wet Rotary TOTAL DEPTH: 97 Feet HOLE DIAMETER: 6.75 Inches

SITE COORDINATES: N 240881.98 / E 795473.86 ELEVATIONS: GROUND: 2452.7 PAD: 2452.99 TOC: 2455.65 PROT. CSG: 2456.01

WATER LEVEL: DEPTH: DATUM: DATE: TIME:

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION
0				SM		SILTY SAND –fine to very fine grained rounded quartz, with 20 to 30% silt, compact, dry, reddish tan color
						–caliche sand below 4 feet, lightly cemented to uncemented, light reddish tan color
10						
						–sandstone seam from 16 to 16.5 feet, with occassional caliche nodules scattered throughout
20						
30						–sandstone seam from 32 to 44 feet, lightly cemented, very soft
40						
50						
60						
70						–saturated below 69 feet
80						
90						–sandstone seam from 89 to 90 feet
						–"false Red Bed" at 96 feet, clayey sand, brick red color
100						BORING TERMINATED AT 97.0 FEET BELOW GRADE



(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MW-ST-SC.WK3

MONITOR WELL CONSTRUCTION

JONES & NEUSE
GULF COAST REGION OF RMT

WELL NO. MW-155A

CLIENT: Fina Oil and Chemical | JOB NO: 50-00195.05.002 | SHEET 1 OF 2

SITE: Big Spring Refinery | DATE: START: 10/17/94 | FINISH: 10/18/94

GEOLOGIST: Brad Stokes | DRILLER: Choate Well Service | DRILLING RIG TYPE: Failing 1000

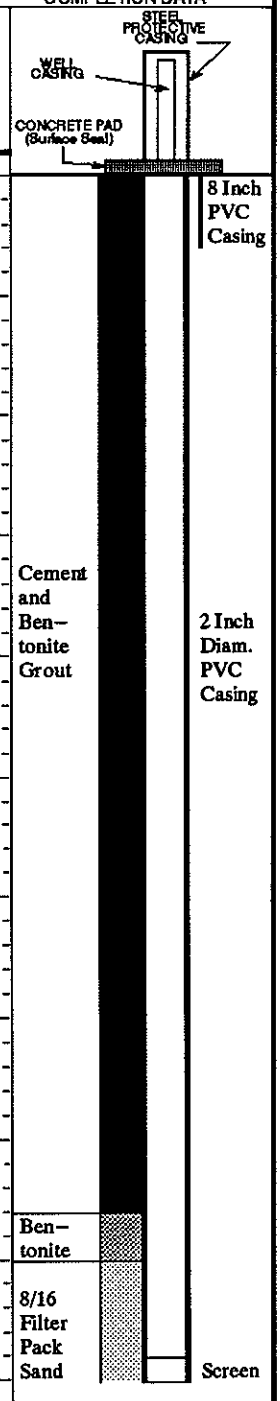
DRILLING METHODS: Air / Wet Rotary | TOTAL DEPTH: 120 Feet | HOLE DIAMETER: 6.75 Inches

SITE COORDINATES: N 240881.11 / E 795473.86 | ELEVATIONS: GROUND: 2452.2 | PAD: 2452.45 | TOC: 2455.11 | PROT. CSG: 2455.50

WATER LEVEL: DEPTH: | DATUM: | DATE: | TIME:

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION
0				SM		SILTY SAND –fine to very fine grained, rounded quartz, with 20 to 30% silt in matrix, compact, dry, reddish tan color
						–some caliche sand, uncemented, light reddish tan color
10						
20						
						–sandstone seam from 25 to 25.5 feet, moderately cemented
30						–sandstone seam from 28 to 29 feet, moderately cemented
40						–sandstone seam from 38 to 40 feet, moderately cemented
50						
60						
70						–saturated below 69 feet, slight odor
80						–sandstone seam from 82 to 85 feet, moderately cemented
90						–sandstone seam from 89 to 90 feet, moderately cemented
100				GW		SANDY GRAVEL well rounded quartz chert and limestone gravel, pebble sized, with medium to fine quartz sand, well graded

COMPLETION DATA



(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MW-ST-SC.WK3

MONITOR WELL CONSTRUCTION

JONES & NEUSE
GULF COAST REGION OF RMT

WELL NO. MW-155A

CLIENT: Fina Oil and Chemical JOB NO: 50-00195.05.002 SHEET 2 OF 2

SITE: Big Spring Refinery DATE: START: 10/17/94 FINISH: 10/18/94

GEOLOGIST: Brad Stokes DRILLER: Choate Well Service DRILLING RIG TYPE: Failing 1000

DRILLING METHODS: Air / Wet Rotary TOTAL DEPTH: 120 Feet HOLE DIAMETER: 6.75 Inches

SITE COORDINATES: N 240881.11 / E 795473.86 ELEVATIONS: GROUND: 2452.2 PAD: 2452.45 TOC: 2455.11 PROT. CSG: 2455.50

WATER LEVEL: DEPTH: DATUM: DATE: TIME:

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION	MATERIAL SETTINGS	COMPLETION DATA
100						SANDY GRAVEL		BELOW GRADE MATERIAL COMPLETIONS CONTINUED FROM PREVIOUS PAGE
110				CH		SILTY CLAY –moderate plasticity, with 20 to 25% silt and fine sand in matrix, stiff, damp, brick red color, DOCKUM FM.	107	
120				Ss		SANDSTONE –very fine to fine grained, moderately cemented to well cemented, hard, dark red	120	
						BORING TERMINATED AT 120.0 FEET BELOW GRADE		

(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MW-P2-SC.WK3

MONITOR WELL CONSTRUCTION

JONES & NEUSE
GULF COAST REGION OF RMT

WELL NO. MW–163

CLIENT: FINA OIL AND CHEMICAL COMPANY JOB NO: 50–00195.05.0002 SHEET 1 OF 1

SITE: BIG SPRING, TEXAS REFINERY DATE: START: March 9, 1995 FINISH: March 10, 1995

GEOLOGIST: Colby Drechsel DRILLER: Dusty Choate/CD Services DRILLING RIG TYPE: Failing 1000

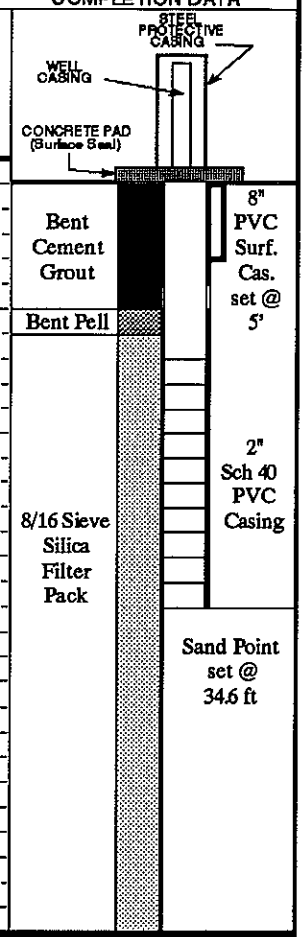
DRILLING METHODS: Air/wet Rotary TOTAL DEPTH: 60' HOLE DIAMETER: 6–3/4"

SITE COORDINATES: N239404.33/E787460.07 ELEVATIONS: GROUND: 2397.07' PAD: 2397.28' TOC: 2399.9' PROT. CSG:

WATER LEVEL: DEPTH: DATUM: DATE: TIME:

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION
0						
10				SM		Silty SAND poorly graded, 10–15% moderately plastic silt, very fine grained sand, light brown, buff and pink color, dry, isolated calcareous nodules, Ogallala 10–15% caliche nodules in 1' thick lenses
		15				– similar to above except saturated
20				SS		SANDSTONE dense, moderately calcarous cementation, pink, damp, Ogallala FM
30				SM		Silty SAND poorly graded, 10–15% moderately plastic silt, very fine grained sand, buff to pink color, saturated, isolated calcareous nodules, Ogallala FM
						34' – hard, reddish tan color
40				SS		SANDSTONE dense, moderately calcarous cementation, pink, damp, Ogallala FM
				GP		GRAVEL poorly graded with <8% sand, reddish pink, loose, fine to medium pebble gravel(ls, chert, quartz) saturated, Ogallala FM
50		48				
				CH		CLAY highly plastic, damp to moist, red, Dockum FM
60						
						BOREHOLE TERMINATED 60 FEET BELOW GRADE
70						
80						
90						
100						

COMPLETION DATA



(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MW–STAND.WK3

MONITOR WELL CONSTRUCTION

JONES & NEUSE
GULF COAST REGION OF RMT

WELL NO. MW-163A

CLIENT: FINA OIL AND CHEMICAL COMPANY JOB NO: 50-00195.05.0002 SHEET 1 OF 1

SITE: BIG SPRING, TEXAS REFINERY DATE: START: March 9, 1995 FINISH: March 10, 1995

GEOLOGIST: Colby Drechsel DRILLER: Dusty Choate DRILLING RIG TYPE: Failing 1000

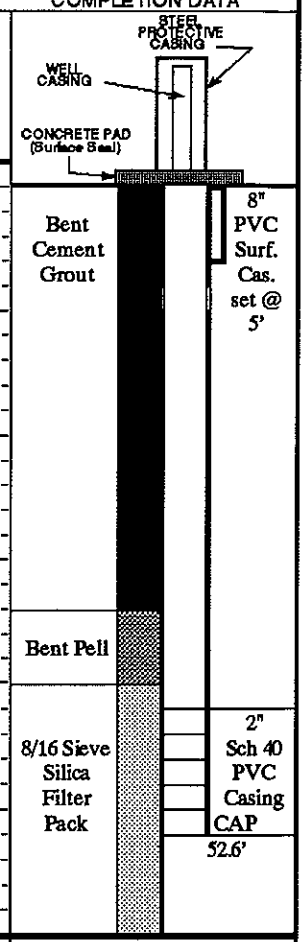
DRILLING METHODS: Air/wet rotary TOTAL DEPTH: 60' HOLE DIAMETER: 6-3/4"

SITE COORDINATES: N239413.61/E787453.86 ELEVATIONS: GROUND: 2397.59' PAD: 2397.84' TOC: 2400.56' PROT. CSG:

WATER LEVEL: DEPTH: DATUM: DATE: TIME:

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION
0						
10				SM		Silty SAND poorly graded, 10–15% moderately plastic silt, very fine grained sand, buff to pink color, dry, isolated calcareous nodules, Ogallala FM
		15				– similar to above except saturated
20				SS		SANDSTONE dense, moderately calcarous cementation, pink, damp, Ogallala FM
				SM		Silty SAND poorly graded, 10–15% moderately plastic silt, very fine grained sand, buff to pink color, saturated, isolated calcareous nodules, Ogallala FM
30						
40				SS		SANDSTONE dense, moderately calcarous cementation, pink, damp, Ogallala FM
				GP		GRAVEL poorly graded with <8% sand, reddish pink, loose, fine–grained, saturated, Ogallala FM
50		48				
				CH		CLAY highly plastic, dense, damp to moist, red, Dockum FM
60						
						BOREHOLE TERMINATED AT 60 FEET BELOW GRADE
70						
80						
90						
100						

COMPLETION DATA



(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MW-STAND.WK3

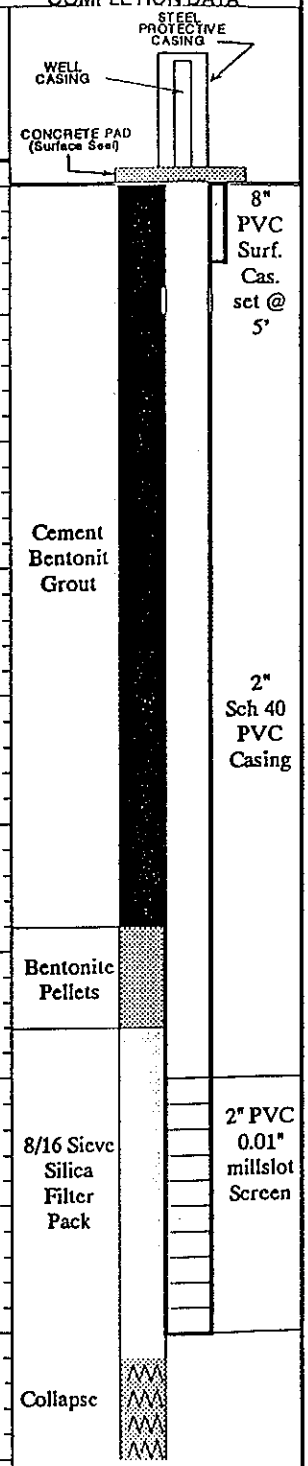
MONITOR WELL CONSTRUCTION

JONES & NEUSE
GULF COAST REGION OF RMT

WELL NO. MW-165
CLIENT: FINA OIL AND CHEMICAL COMPANY JOB NO: 50-00195.05.0002 SHEET 1 OF 1
SITE: BIG SPRING, TEXAS REFINERY DATE: START: March 9, 1995 FINISH: March 10, 1995
GEOLOGIST: Colby Drechsel DRILLER: Dusty Choate DRILLING RIG TYPE: Failing 1000
DRILLING METHODS: Air/wet rotary TOTAL DEPTH: 120' HOLE DIAMETER: 6-3/4"
SITE COORDINATES: N240725.25/E797358.13 ELEVATIONS: GROUND: 2450.41' PAD: 2450.62' TOC: 2453.34' PROT. CSG:
WATER LEVEL: DEPTH: DATUM: DATE: TIME:

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION
0				SM		Silty SAND uniform very fine sand, ~10% highly plastic silt, loose to slightly cohesive, pink, dry, Ogallala FM
				SS		SANDSTONE hard (mod. cemented), fine grain sand, dry
				SM		Silty SAND uniform very fine sand, ~10% highly plastic silt, loose, reddish tan dry, Ogallala FM
70		69				
						– similar to above except silt increases to ~30%, tan
						– similar to above except ~40% silt, cohesive, reddish tan

COMPLETION DATA



(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MW-S1AND.WK3

MONITOR WELL CONSTRUCTION

JONES & NEUSE
GULF COAST REGION OF RMT

WELL NO. MW-165A

CLIENT: FINA OIL AND CHEMICAL COMPANY JOB NO: 50-00195.05.0002 SHEET 1 OF 2

SITE: BIG SPRING, TEXAS REFINERY DATE: START: March 9, 1995 FINISH: March 10, 1995

GEOLOGIST: Colby Drechsel DRILLER: Dusty Choate DRILLING RIG TYPE: Failing 1000

DRILLING METHODS: Air/wet rotary TOTAL DEPTH: 120' HOLE DIAMETER 6-3/4"

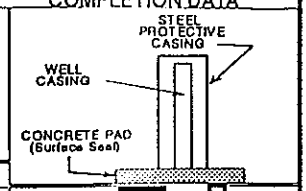
SITE COORDINATES: N240706.33/E797360.27 ELEVATIONS: GROUND: 2450.12' PAD: 2450.32' TOC: 2453.02' PROT CSG

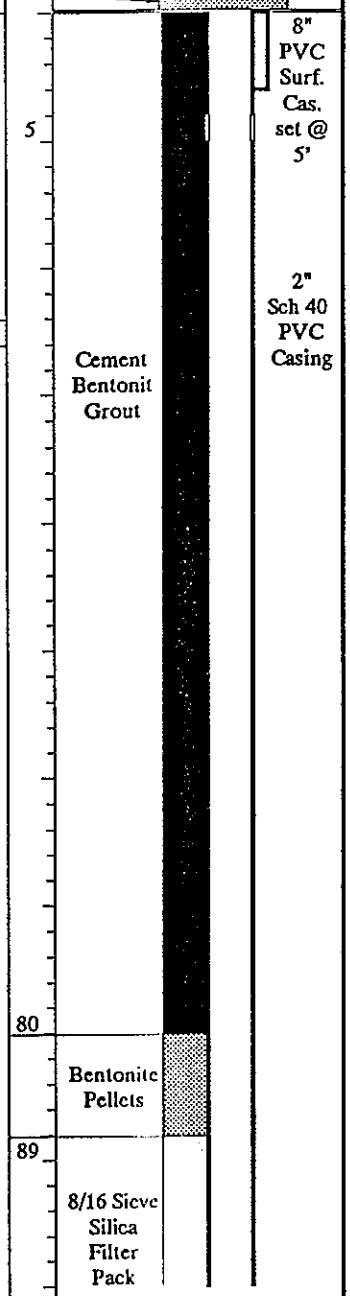
WATER LEVEL: DEPTH: DATUM: DATE: TIME

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION
0				SM		Silty SAND uniform very fine sand, ~10% highly plastic silt, loose to slightly cohesive, pink, dry, Ogallala FM
10						
20						
				SS		SANDSTONE hard (mod. cemented), fine grain sand, dry
				SM		Silty SAND uniform very fine sand, ~10% highly plastic silt, loose, reddish tan dry, Ogallala FM
30						
40						
50						
60						– similar to above except silt increases to ~30%, tan
70		70				
80						
90						– similar to above except ~40% silt, cohesive, reddish tan
100						

Continued On Page 2

COMPLETION DATA





Continued on Page 2

(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MW-S1AND.WK3

MONITOR WELL CONSTRUCTION

JONES & NEUSE
GULF COAST REGION OF RMT

WELL NO. MW-165A

CLIENT: FINA OIL AND CHEMICAL COMPANY JOB NO: 50-00195.05.0002 SHEET 2 OF 2

SITE: BIG SPRING, TEXAS REFINERY DATE: START: March 13, 1995 FINISH: March 14, 1995

GEOLOGIST: Colby Drechsel DRILLER: Dusty Choate DRILLING RIG TYPE: Failing 1000

DRILLING METHODS: Air/wet rotary TOTAL DEPTH: HOLE DIAMETER: 6-3/4"

SITE COORDINATES: N240706.33/E797360.27 ELEVATIONS: GROUND: 2450.12' PAD: 2450.32' TOC: 2453.02' PROT. CSG:

WATER LEVEL: DEPTH: DATUM: DATE: TIME:

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION	COMPLETION DATA: MATERIAL SETTINGS
100							Continued from Page 1
				SM		Silty SAND uniform very fine sand, ~ 10% highly plastic silt, loose, reddish tan, dry	103
				GP		Sandy GRAVEL gap graded with ~30% fine subrounded sand and ~70% fine (0.5 to 2 cm) subrounded chert gravel, tan and red, saturated Ogallala FM	8/16 Sieve Silica Filter Pack
110		108		CH		CLAY highly plastic, dense, red, damp to moist, Dockum FM	113
120							120
						BOREHOLE TERMINATED 120 FEET BELOW GRADE	
130							
140							
150							
160							
170							
180							
190							
200							

(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MW-STAND.WK3

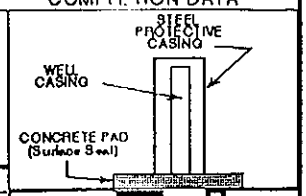
MONITOR WELL CONSTRUCTION

JONES & NEUSE
GULF COAST REGION OF RMT

WELL NO. MW-166
CLIENT: FINA OIL AND CHEMICAL COMPANY JOB NO: 50-00195.05.0002 SHEET 1 OF 1
SITE: BIG SPRING, TEXAS REFINERY DATE: START: March 13, 1995 FINISH: March 14, 1995
GEOLOGIST: Colby Drechsel DRILLER: Dusty Choate DRILLING RIG TYPE: Failing 1000
DRILLING METHODS: Air/wet rotary TOTAL DEPTH: 100' HOLE DIAMETER: 6-3/4"
SITE COORDINATES: N238921.80/E798006.59 ELEVATIONS: GROUND: 2439.29' PAD: 2439.49' TOC: 2442.20' PROT CSG
WATER LEVEL: DEPTH: DATUM: DATE: TIME:

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION
0				SM		Silty SAND poorly graded very fine sand with ~20% low plasticity silt, well cemented with calcareous cement (caliche), moderate density, dry, pink to white Ogallala FM
20				SS		SANDSTONE fine grain, moderately cemented with calcarous cement, pink, dry, Ogallala FM
				SM		Silty SAND poorly graded, ~30% silt, loose, pinkish tan, dry, Ogallala FM
				SS		SANDSTONE fine grain, moderately cemented with calcarous cement, pink, dry,
30				SM		Silty SAND poorly graded, ~30% silt, loose, pinkish tan, dry, Ogallala FM
				SS		SANDSTONE fine grain, moderately cemented with calcarous cement, pink, dry, Ogallala FM
40				SM		Silty SAND poorly graded, ~30% silt, loose, pinkish tan, dry, Ogallala FM
				SS		SANDSTONE fine grain, moderately cemented with calcarous cement, pink, dry,
				SM		Silty SAND poorly graded, V. fine grained, ~20% silt, loose, pinkish tan, dry, Ogallala FM
50				SS		SANDSTONE fine grain, moderately cemented with calcarous cement, pink, dry, Ogallala FM
				SM		Silty SAND poorly graded, V. fine grained, ~20% silt, loose, pinkish tan, dry, Ogallala FM
60						
70	69					– top of saturation at 69 feet
80				SS		SANDSTONE fine grain, moderately cemented with calcarous cement, pink, saturated
				SM		Silty SAND poorly graded, V. fine grained, ~20% silt, loose, pinkish tan, saturated
				SS		SANDSTONE fine grain, moderately cemented with calcarous cement, pink, saturated
90				SM		Silty SAND poorly graded, V. fine grained, ~20% silt, loose, pinkish tan, saturated
				SS		SANDSTONE fine grain, moderately cemented with calcarous cement, pink, saturated
				SM		Silty SAND poorly graded, V. fine grained, ~20% silt, loose, pinkish tan, saturated
				GP		GRAVEL fine to medium angular chert gravel, loose, saturated, Ogallala FM
100	95			CH		CLAY highly plastic, dense, red, damp to moist, Dockum FM
						BOREHOLE TERMINATED 100 FEET BELOW GRADE

COMPLETION DATA



(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MW-STAND.WK3

MONITOR WELL CONSTRUCTION

JONES & NEUSE
GULF COAST REGION OF RMT

WELL NO. MW-166A

CLIENT: FINA OIL AND CHEMICAL COMPANY JOB NO: 50-00195.05.0002 SHEET 1 OF 1

SITE: BIG SPRING, TEXAS REFINERY DATE: START: March 13, 1995 FINISH: March 14, 1995

GEOLOGIST: Colby Drechsel DRILLER: Dusty Choate DRILLING RIG TYPE: Failing 1000

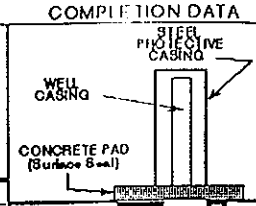
DRILLING METHODS: Air/wet rotary TOTAL DEPTH: 100' HOLE DIAMETER: 6-3/4"

SITE COORDINATES: N238913.44/E798008.21 ELEVATIONS: GROUND: 2434.85' PAD: 2439.52' TOC: 2442.21' PROT CSG

WATER LEVEL: DEPTH: DATUM: DATE: TIME:

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION
0				SM		Silty SAND poorly graded very fine sand with ~20% low plasticity silt, well cemented with calcareous cement (caliche), moderate density, dry, pink to white Ogallala FM
20				SS		SANDSTONE fine grain, moderately cemented with calcarous cement, pink, dry, Ogallala FM
				SM		Silty SAND poorly graded, ~30% silt, loose, pinkish tan, dry, Ogallala FM
30				SS		SANDSTONE fine grain, moderately cemented with calcarous cement, pink, dry,
				SM		Silty SAND poorly graded, ~30% silt, loose, pinkish tan, dry, Ogallala FM
				SS		SANDSTONE fine grain, moderately cemented with calcarous cement, pink, dry, Ogallala FM
40				SM		Silty SAND poorly graded, ~30% silt, loose, pinkish tan, dry, Ogallala FM
				SS		SANDSTONE fine grain, moderately cemented with calcarous cement, pink, dry,
50				SM		Silty SAND poorly graded, V. fine grained, ~20% silt, loose, pinkish tan, dry, Ogallala FM
				SS		SANDSTONE fine grain, moderately cemented with calcarous cement, pink, dry, Ogallala FM
60				SM		Silty SAND poorly graded, V. fine grained, ~20% silt, loose, pinkish tan, dry, Ogallala FM
70	69					– top of saturation at 69 feet
80				SS		SANDSTONE fine grain, moderately cemented with calcarous cement, pink, saturated
				SM		Silty SAND poorly graded, V. fine grained, ~20% silt, loose, pinkish tan, saturated
				SS		SANDSTONE fine grain, moderately cemented with calcarous cement, pink, saturated
90				SM		Silty SAND poorly graded, V. fine grained, ~20% silt, loose, pinkish tan, saturated
				SS		SANDSTONE fine grain, moderately cemented with calcarous cement, pink, saturated
				SM		Silty SAND poorly graded, V. fine grained, ~20% silt, loose, pinkish tan, saturated
				GP		GRAVEL fine to medium angular chert gravel, loose, saturated, Ogallala FM
100	95			CH		CLAY highly plastic, dense, red, damp to moist, Dockum FM
						BOREHOLE TERMINATED 100 FEET BELOW GRADE

COMPLETION DATA



5: 8" PVC Surf. Cas. set @ 5'

2" Sch 40 PVC Casing

Cement Bentonite Grout

72: Bentonite Pellets

83: 8/16 Sieve Silica Filter Sand

90: 2" PVC 0.01 slot Screen

95: Sand Point set @ 95.6'

100

(1) UNIFIED SOIL CLASSIFICATION SYSTEM

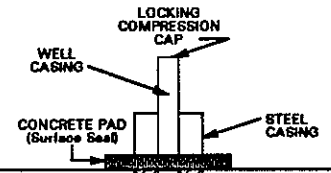
MW-STAND.WK3

WELL CONSTRUCTION LOG

WELL NO. RW-179

Client: FINA OIL AND CHEMICAL COMPANY	Start Date: 10-1-95	End Date: 10-1-95	Page 1 of 2
Site: Big Spring, Texas	Drilling Method: Air/ Wet Rotary		Project Number: 50-00195.77
Geologist: Tracy Payne	Driller: Diversified/Powell	Drill Rig Type: Mayhew 1000	Borehole Diameter: 14 Inches
Site Coordinates: N: 240641.6300 E: 792300.0700	Total Depth: 80.00	Surface Elevation (ft.): 2433.50	TOC Elevation (ft.): 2434.75 / PAD Elevation (ft.): 2433.75
Datum Description: GRADE LEVEL	Datum Elevation:	Water Level Depth Below TOC (ft): / Date: / Time:	

Sample Type	Recovery (feet)	Saturation	Field Test S.C. (mS)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
X				1–9		Silty Sand (SM) - very fine grained, 30-40% silt, poorly graded, loose, dry, reddish brown, no odor.
X				10–19		Silty Sand (SM) - similar to above, reddish tan.
X				20–29		Silty Sand (SM) - similar to above.
X				30–39		Silty Sand (SM) - similar to above, faint odor @ 35' BGL, increasing in intensity with depth.
X				40–49		Silty Sand (SM) - similar to above, very strong odor @ 45' BGL saturation @ 48'.



16" ID Steel surface casing to 5'

Cement/Bentonite Grout

8"ID Schedule 40 PVC riser

33.0 Stainless steel centralizer

Bentonite seal

36.0

43.0

8" ID 0.020 MILL Slot Schedule 40 PVC Screen

WELL 19677 12/12/95

F-204A Austin (8-95)

Continued Next Page

WELL CONSTRUCTION LOG

WELL NO. RW-179

Client: FINA OIL AND CHEMICAL COMPANY	Start Date: 10-1-95	End Date: 10-1-95	Page 2 of 2
Site: Big Spring, Texas	Drilling Method: Air/ Wet Rotary		Project Number: 50-00195.77
Geologist: Tracy Payne	Driller: Diversified/Powell	Drill Rig Type: Mayhew 1000	Borehole Diameter: 14 Inches
Site Coordinates: N: 240641.6300 E: 792300.0700	Total Depth: 80.00	Surface Elevation (ft.): 2433.50	TOC Elevation (ft.): 2434.75 / PAD Elevation (ft.): 2433.75
Datum Description: GRADE LEVEL	Datum Elevation:	Water Level Depth Below TOC (ft): / Date:	Time:

Sample Type	Recovery (feet)	Saturation	Field Test S.C. (mS)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
X				51–59		Silty Sand (SM) - very fine grained, 30-40% silt, poorly graded, loose, reddish brown, with sandstone seams, emulsified oil in return pit.
X				60–69		Silty Sand (SM) - similar to above.
X				70–75		Silty Sand (SM) - similar to above.
				76–79		Clay (CH) - False Red Bed.
				80–99		Borehole Terminated at a depth of 80 feet BGL

8/16 Sieve sand filter pack

73.0 End Cap

73.5

80.0

WELL 19577 12/12/95

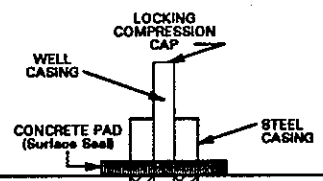
F-204A Austin (8-95)

WELL CONSTRUCTION LOG

WELL NO. RW-192

Client: FINA OIL AND CHEMICAL COMPANY		Start Date: 10-18-95	End Date: 10-18-95	Page 1 of 3
Site: Big Spring, Texas		Drilling Method: Air/Wet Rotary		Project Number: 50-00195.77
Geologist: Tracy Payne	Driller: Diversified/Powell	Drill Rig Type: Mayhew 1000		Borehole Diameter: 14 Inches
Site Coordinates: N: 240501.5200 E: 789968.5400	Total Depth: 110.00	Surface Elevation (ft.): 2459.94	TOC Elevation (ft.): 2461.24	PAD Elevation (ft.): 2460.19
Datum Description: GRADE LEVEL	Datum Elevation:	Water Level Depth Below TOC (ft):	Date:	Time:

Sample Type	Recovery (feet)	Saturation	Field Test S.C. (mS)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
X				1–7		Silty Sand (SM) - very fine grained, 30-40% silt, loose, dry, no odor, reddish brown.
X				8–9		Silty Sand (SM) - very fine grained, 20% silt, poorly graded, loose, dry, light tan, no odor, occasional sandstone seams.
X				10–19		Silty Sand (SM) - similar to above.
X				20–29		Sand (SW) - medium to fine grained, well graded, loose, dry, tan, no odor.
X				30–39		Sand (SW) - similar to above.
X				40–49		Sand (SW) - similar to above, increase in silt 20% @ 45' BGL.



16" ID Steel surface casing to 5'

Cement/Bentonite Grout

8"ID Schedule 40 PVC riser

WELL 19577 12/12/95

F-204A Austin (8-95)

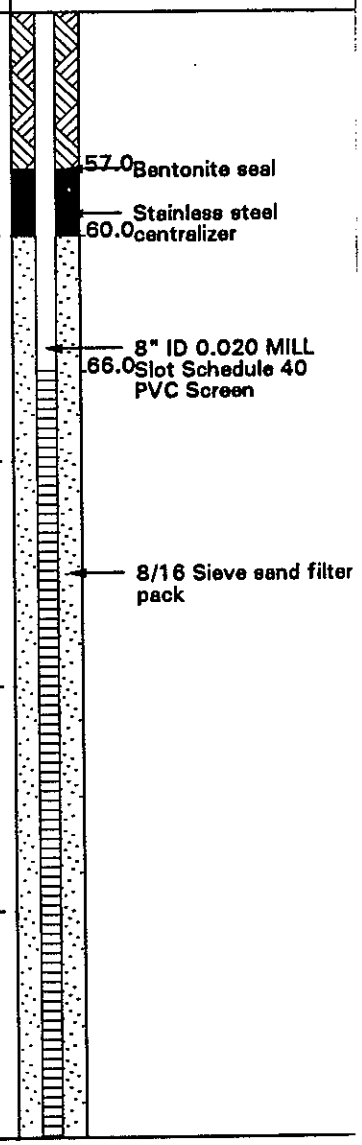
Continued Next Page

WELL CONSTRUCTION LOG

WELL NO. RW-192

Client: FINA OIL AND CHEMICAL COMPANY	Start Date: 10-18-95	End Date: 10-18-95	Page 2 of 3
Site: Big Spring, Texas	Drilling Method: Air/Wet Rotary		Project Number: 50-00195.77
Geologist: Tracy Payne	Driller: Diversified/Powell	Drill Rig Type: Mayhew 1000	Borehole Diameter: 14 Inches
Site Coordinates: N: 240501.5200 E: 789968.5400	Total Depth: 110.00	Surface Elevation (ft.): 2459.94	TOC Elevation (ft.): 2461.24 / PAD Elevation (ft.): 2460.19
Datum Description: GRADE LEVEL	Datum Elevation:	Water Level Depth Below TOC (ft):	Date: / Time:

Sample Type	Recovery (feet)	Saturation	Field Test S.C. (mS)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				51–59		Silty Sand (SM) - very fine grained, 40% silt, poorly graded, loose, dry, no odor, tan.
				60–69		Silty Sand (SM) - similar to above, odor @ 65' BGL, dry, occasional sandstone seams.
		▽		70–79		Silty Sand (SM) - similar to above, odor very strong, with discolored soil, saturation @ 73' BGL.
				80–89		Silty Sand (SM) - similar to above, strong odor, free-phase hydrocarbon in return pit, occasional sandstone seams.
				90–99		Silty Sand (SM) - similar to above, with occasional sandstone seams.



WELL 19577 12/12/95

F-204A Austin (8-95)

Continued Next Page

WELL CONSTRUCTION LOG

WELL NO. RW-192

Client: FINA OIL AND CHEMICAL COMPANY	Start Date: 10-18-95	End Date: 10-18-95	Page 3 of 3
Site: Big Spring, Texas	Drilling Method: Air/Wet Rotary		Project Number: 50-00195.77
Geologist: Tracy Payne	Driller: Diversified/Powell	Drill Rig Type: Mayhew 1000	Borehole Diameter: 14 Inches
Site Coordinates: N: 240501.5200 E: 789968.5400	Total Depth: 110.00	Surface Elevation (ft.): 2459.94	TOC Elevation (ft.): 2461.24 / PAD Elevation (ft.): 2460.19
Datum Description: GRADE LEVEL	Datum Elevation:	Water Level Depth Below TOC (ft):	Date: / Time:

Sample Type	Recovery (feet)	Saturation	Field Test S.C. (mS)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				101–110		Gravelly Sand (SW) - subangular, fine-medium grained, loose, reddish brown, pebble sized gravel, chert, 10% gravel.
				106–110		Clay (CH) - mod-low plasticity, very soft, saturation light reddish brown. Dockum FM
				110		T.D. @ 110' BGL

WELL 19577 12/12/95

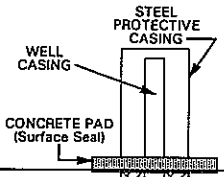
F-204A Austin (8-95)

WELL CONSTRUCTION LOG

WELL NO. RW-194

Client:		Start Date:	End Date:	Page of
FINA OIL AND CHEMICAL COMPANY		10-2-96	10-2-96	1 3
Site:		Drilling Method:		Project Number:
BIG SPRING, TEXAS		AIR/WET ROTARY		50-01858.16
Geologist:	Driller:	Drill Rig Type:		Borehole Diameter:
BRAD STOKES	CHOATE WELL SERVICE	GARDNER DENVER 1500		7.88 Inches
Site Coordinates, UTM in ft.:	Total Depth (ft-bgl):	Surface Elevation(ft)	TOC Elevation(ft)	PAD Elevation(ft)
N: 239498.8500 E: 794005.0200	120.00	2441.50	2441.86	2443.89
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (feet)	Saturation	OVM (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				1-4		Clayey Sand (SC) - Fine to medium, with 15% clay, some silt, damp, reddish brown.
				5		Caliche from 4-5 feet, dry, hard, white.
				6-9		Silty Sand (SM) - Very fine grained, with 25-35% silt, compact, dry, pink to reddish tan color, lithology remains the same between cemented zones.
				10-19		Silty Sand (SM) - Similar to above.
				20-29		Silty Sand (SM) - Similar to above. Lightly cemented zone, carbonate cement. Lightly cemented zone, carbonate cement.
				30-39		Silty Sand (SM) - Similar to above.
				40-49		Silty Sand (SM) - Similar to above. Lightly cemented zone, carbonate cement.



WELL 01858 1/7/97

F-204A Austin (8-95)

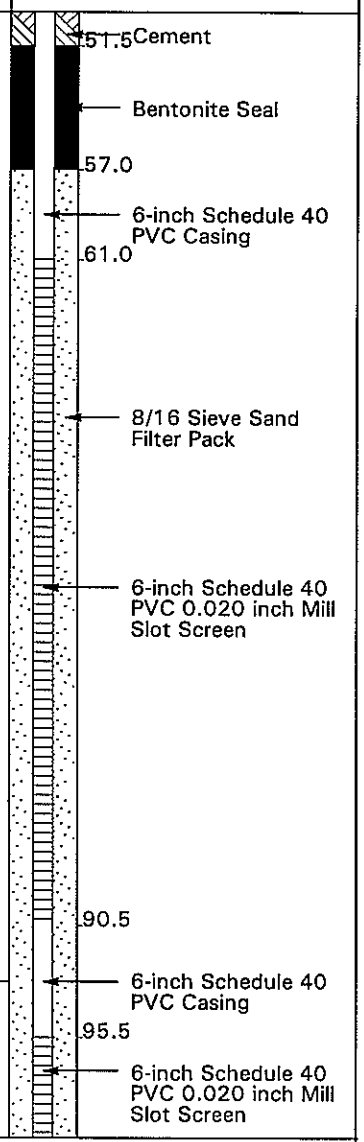
Continued Next Page

WELL CONSTRUCTION LOG

WELL NO. RW-194

Client:		Start Date:	End Date:	Page of
FINA OIL AND CHEMICAL COMPANY		10-2-96	10-2-96	2 3
Site:		Drilling Method:		Project Number:
BIG SPRING, TEXAS		AIR/WET ROTARY		50-01858.16
Geologist:	Driller:	Drill Rig Type:		Borehole Diameter:
BRAD STOKES	CHOATE WELL SERVICE	GARDNER DENVER 1500		7.88 Inches
Site Coordinates, UTM in ft.:	Total Depth (ft-bgl):	Surface Elevation(ft)	TOC Elevation(ft)	PAD Elevation(ft)
N: 239498.8500 E: 794005.0200	120.00	2441.50	2441.86	2443.89
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (feet)	Saturation	OVM (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				51–99		Silty Sand (SM) - Very fine grained with 25-35% silt, compact, dry, pink to reddish tan color, lithology remains the same between cemented zones. Lightly cemented zone, carbonate cement. Lightly cemented zone, carbonate cement. Silty Sand (SM) - Similar to above. Water level at 63 feet after 45 minutes Becomes damp below 64 feet. Saturated below 67 feet. Silty Sand (SM) - Similar to above. Silty Sand (SM) - Similar to above. Lightly cemented, sandstone. Clayey Silty Sand (SC/SM) - Shaley/clayey, red, "False Red Bed". Sandy Gravel (GW) - Well rounded to subrounded, chert and quartz, with 20% medium grained sand, multicolored, also limestone and shell fragments, granule to pebble sized.



WELL 01858 1/7/97

F-204A Austin (8-95)

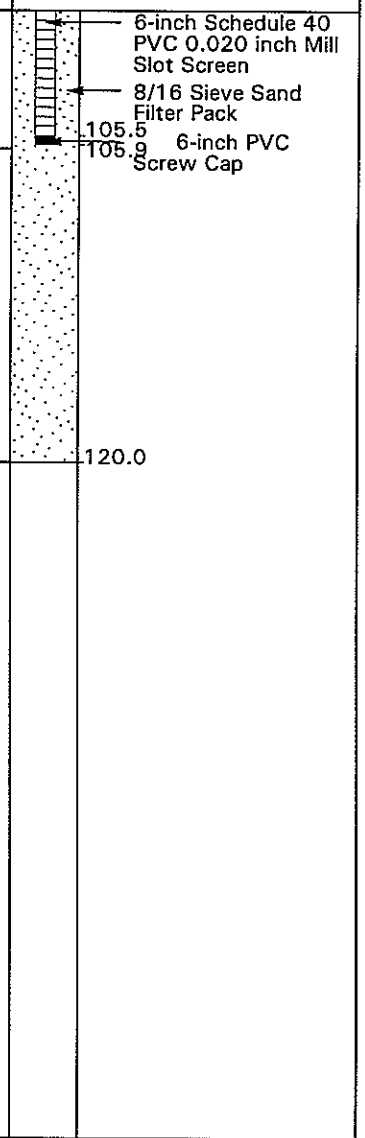
Continued Next Page

WELL CONSTRUCTION LOG

WELL NO. RW-194

Client:		Start Date:	End Date:	Page of
FINA OIL AND CHEMICAL COMPANY		10-2-96	10-2-96	3 3
Site:		Drilling Method:		Project Number:
BIG SPRING, TEXAS		AIR/WET ROTARY		50-01858.16
Geologist:	Driller:	Drill Rig Type:		Borehole Diameter:
BRAD STOKES	CHOATE WELL SERVICE	GARDNER DENVER 1500		7.88 Inches
Site Coordinates, UTM in ft.:	Total Depth (ft-bgl):	Surface Elevation(ft)	TOC Elevation(ft)	PAD Elevation(ft)
N: 239498.8500 E: 794005.0200	120.00	2441.50	2441.86	2443.89
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (feet)	Saturation	OVM (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				101-106		Sandy Gravel (GW) - Well rounded to subrounded, chert and quartz, with 20% medium grained sand, multicolored, also limestone and shell fragments, granule to pebble sized. Large gravel, loosing circulation, no cuttings return.
				107-120		Silty Clay (CL) - Moderate plasticity with 15-20% silt in matrix, hard, dry, brick red color, Dockum Formation. Silty Clay (CL) - Similar to above.
				121-149		BORING TERMINATED AT 120 FEET BELOW GRADE



WELL 01858 1/7/97

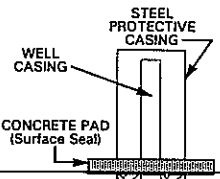
F-204A Austin (8-95)

WELL CONSTRUCTION LOG

WELL NO. RW-195

Client:		Start Date:	End Date:	Page of
FINA OIL AND CHEMICAL COMPANY		10-3-96	10-3-96	1 3
Site:		Drilling Method:		Project Number:
BIG SPRING, TEXAS		AIR/WET ROTARY		50-01858.16
Geologist:	Driller:	Drill Rig Type:		Borehole Diameter:
BRAD STOKES	CHOATE WELL SERVICE	GARDNER DENVER 1500		7.88 Inches
Site Coordinates, UTM in ft.:	Total Depth (ft-bgl):	Surface Elevation(ft)	TOC Elevation(ft)	PAD Elevation(ft)
N: 238360.1700 E: 793840.4600	100.00	2432.20	2434.41	2432.42
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (feet)	Saturation	OVM (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				1		Topsoil - Compact silty sand, dry to damp, brown.
				2 3		Clayey Sand (SC) - Low plasticity with 15-20% clay fines, damp, reddish brown to red color.
				4		Caliche
				5 6 7 8 9		Silty Sand (SM) - Very fine grained with 25-35% silt, compact, dry, pink to tan color with occasional lightly cemented seams throughout, lithology remains the same between cemented zones.
				10 11 12 13 14 15 16 17 18 19		Silty Sand (SM) - Similar to above. Some cemented zones from 10-20 feet.
				20 21 22 23 24 25 26 27 28 29		Silty Sand (SM) - Similar to above.
				30 31 32 33 34 35 36 37 38 39		Silty Sand (SM) - Similar to above.



WELL 01858 1/7/97

F-204A Austin (8-95)

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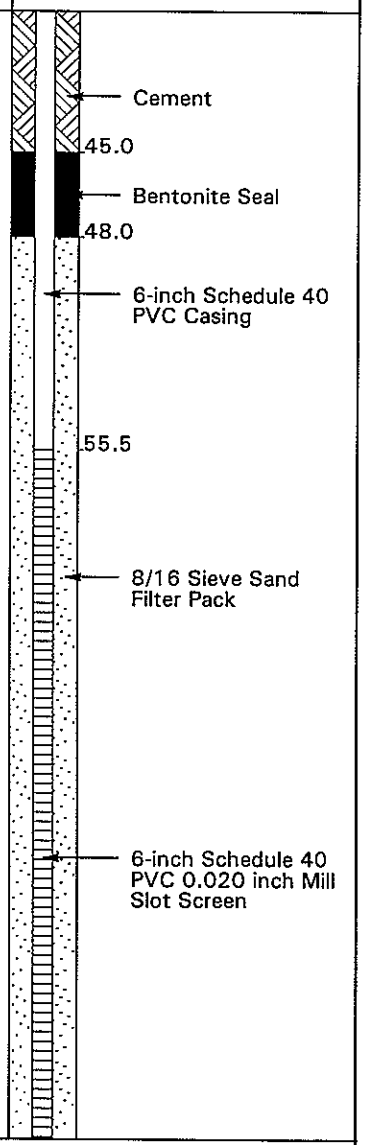
WELL CONSTRUCTION LOG

WELL NO. RW-195

Client: FINA OIL AND CHEMICAL COMPANY		Start Date: 10-3-96	End Date: 10-3-96	Page 2 of 3
Site: BIG SPRING, TEXAS		Drilling Method: AIR/WET ROTARY		Project Number: 50-01858.16
Geologist: BRAD STOKES	Driller: CHOATE WELL SERVICE	Drill Rig Type: GARDNER DENVER 1500		Borehole Diameter: 7.88 Inches
Site Coordinates, UTM in ft.: N: 238360.1700 E: 793840.4600	Total Depth (ft-bgl): 100.00	Surface Elevation(ft) 2432.20	TOC Elevation(ft) 2434.41	PAD Elevation(ft) 2432.42
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (feet)	Saturation	OVM (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				41–79		Silty Sand (SM) - Very fine grained with 25-35% silt, compact, dry, pink to tan color with occasional lightly cemented seams throughout, lithology remains the same between cemented zones. Cemented zones from 41 to 56 feet.
						Silty Sand (SM) - Similar to above.
						Silty Sand (SM) - Similar to above. Becomes damp below 61 feet, more cemented zones. Saturated below 63 feet, slight odor.
						Silty Sand (SM) - Similar to above.



WELL 01858 1/7/97

F-204A Austin (8-95)

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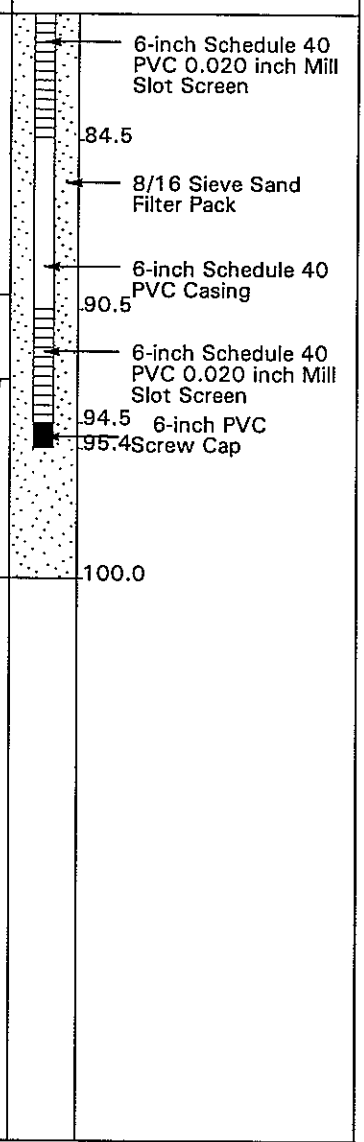
WELL CONSTRUCTION LOG

WELL NO. RW-195

Client: FINA OIL AND CHEMICAL COMPANY		Start Date: 10-3-96	End Date: 10-3-96	Page 3 of 3
Site: BIG SPRING, TEXAS		Drilling Method: AIR/WET ROTARY		Project Number: 50-01858.16
Geologist: BRAD STOKES	Driller: CHOATE WELL SERVICE	Drill Rig Type: GARDNER DENVER 1500		Borehole Diameter: 7.88 Inches
Site Coordinates, UTM in ft.: N: 238360.1700 E: 793840.4600	Total Depth (ft-bgl): 100.00	Surface Elevation(ft) 2432.20	TOC Elevation(ft) 2434.41	PAD Elevation(ft) 2432.42
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (feet)	Saturation	OVM (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				81-90		Silty Sand (SM) - Very fine grained with 25-35% silt, compact, dry, pink to tan color with occasional lightly cemented seams throughout, lithology remains the same between cemented zones.
				85-90		Clayey Silty Sand (SC/SM) - Clayey sand, red, "False Red Bed".
				90-93		Sandy Gravel (GW) - Well graded, granule to pebbled sized, chert, quartz, shells, limestone, with 35-45% fine to medium quartz sand, rounded, multicolored- tan, red, black, pink, white, about 10-15% granule sized, low sphericity (platy) shell material.
				93-100		Silty Clay (CL) - Moderate plasticity with 15-20% silt in matrix, hard, shaley texture, dry, brick red color, Dockum Formation.
				100		BORING TERMINATED AT 100 FEET BELOW GRADE



WELL 01858 1/7/97

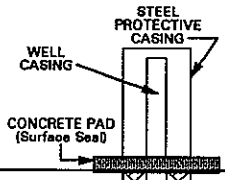
F-204A Austin (8-95)

WELL CONSTRUCTION LOG

WELL NO. MW-214

Client:		Start Date:	End Date:	Page of
FINA OIL AND CHEMICAL COMPANY		1-29-97	1-29-97	1 3
Site:		**Drilling Method:**		**Project Number:**
EAST BOUNDARY INVESTIGATION - BIG SPRING, TEXAS		Air/ Wet Rotary		50-01858.15
Geologist:	**Driller:**	**Drill Rig Type:**		**Borehole Diameter:**
Tracy Payne	Choate Well Service	Failing 1000		6.75 Inches
Site Coordinates, UTM in ft.:	**Total Depth (ft-bgl):**	**Surface Elevation(ft)**	**TOC Elevation(ft)**	**PAD Elevation(ft)**
N: 243573.4000 E: 793754.6600	120.00	2474.45	2477.46	2474.70
Datum Description Source:	**Datum Elev. (ft):**	**Water Level Depth Below Grade(ft):**	**Date:**	**Time:**

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				1–9		Windblown Silty Sand Sediment - Dry, Loose, Black
				1–9		Clayey Sand (SC) - Very fine to fine grained, quartz, 40% clay, compact, damp, reddish orange brown
				10–49		Silty Sand (SM) - Very fine to fine grained, 20% silt, quartz, loose, dry, pinkish tan
				20–49		Silty Sand (SM) - Similar to above, 20-30% silt
				30–49		Silty Sand (SM) - Similar to above
				40–49		Silty Sand (SM) - Similar to above



WELL 01858 1/13/98

F-204A Austin (8-95)

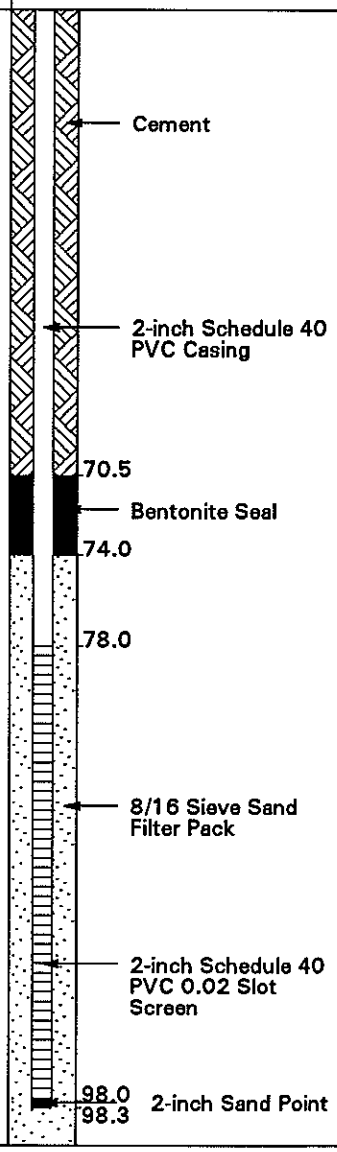
Continued Next Page

WELL CONSTRUCTION LOG

WELL NO. MW-214

Client:		Start Date:	End Date:	Page of
FINA OIL AND CHEMICAL COMPANY		1-29-97	1-29-97	2 3
Site:		**Drilling Method:**		**Project Number:**
EAST BOUNDARY INVESTIGATION - BIG SPRING, TEXAS		Air/ Wet Rotary		50-01858.15
Geologist:	**Driller:**	**Drill Rig Type:**		**Borehole Diameter:**
Tracy Payne	Choate Well Service	Failing 1000		6.75 Inches
Site Coordinates, UTM in ft.:	**Total Depth (ft-bgl):**	**Surface Elevation(ft)**	**TOC Elevation(ft)**	**PAD Elevation(ft)**
N: 243573.4000 E: 793754.6600	120.00	2474.45	2477.46	2474.70
Datum Description Source:	**Datum Elev. (ft):**	**Water Level Depth Below Grade(ft):**	**Date:**	**Time:**

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				51–99		Silty Sand (SM) - Very fine to fine grained, 30% silt, quartz, loose, dry, pinkish tan Silty Sand (SM) - Similar to above Silty Sand (SM) - Similar to above Damp at 75 feet Saturation at 79 feet Silty Sand (SM) - Similar to above, saturated, odor, occasional sandstone nodules Silty Sand (SM) - Similar to above, odor becomes stronger with depth, sheen noted on produced water



WELL 01858 1/13/98

F-204A Austin (8-95)

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WELL CONSTRUCTION LOG

WELL NO. MW-214

Client:		Start Date:	End Date:	Page of
FINA OIL AND CHEMICAL COMPANY		1-29-97	1-29-97	3 3
Site:		**Drilling Method:**		**Project Number:**
EAST BOUNDARY INVESTIGATION - BIG SPRING, TEXAS		Air/ Wet Rotary		50-01858.15
Geologist:	**Driller:**	**Drill Rig Type:**		**Borehole Diameter:**
Tracy Payne	Choate Well Service	Failing 1000		6.75 Inches
Site Coordinates, UTM in ft.:	**Total Depth (ft-bgl):**	**Surface Elevation(ft)**	**TOC Elevation(ft)**	**PAD Elevation(ft)**
N: 243573.4000 E: 793754.6600	120.00	2474.45	2477.46	2474.70
Datum Description Source:	**Datum Elev. (ft):**	**Water Level Depth Below Grade(ft):**	**Date:**	**Time:**

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				101–113		Silty Sand (SM) - Very fine to fine grained, 30% silt, quartz, loose, saturated, pinkish tan, odor increasing
				113–114		Silty Sand (SM) - Similar to above, saturated, odor
				114–115		Sandy Clay (CL) - Low plasticity, 50% sand, very soft, reddish brown, saturated, odor
				115–120		Sandy Gravel (GW) - Well graded, granule to large(1-1.5") pebbles, sub-angular to subrounded, quartz, chert, sandstone, sandstone conglomerates, shell fragments, limestone, saturated, reddish brown, fine to medium grained sand, quartz, 20% sand increasing to 40-50% with depth, strong odor
				120–149		BORING TERMINATED AT 120 FEET BELOW GRADE

8/16 Sieve Sand Filter Pack

104.0

Collapsed Borehole

120.0

WELL 01858 1/13/98

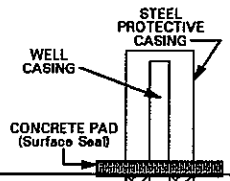
F-204A Austin (8-95)

WELL CONSTRUCTION LOG

WELL NO. MW-214A

Client:		Start Date:	End Date:	Page of
FINA OIL AND CHEMICAL COMPANY		2-3-97	2-3-97	1 3
Site:		**Drilling Method:**		**Project Number:**
EAST BOUNDARY INVESTIGATION - BIG SPRING, TEXAS		Air/ Wet Rotary		50-01858.15
Geologist:	**Driller:**	**Drill Rig Type:**		**Borehole Diameter:**
Tracy Payne	Choate Well Service	Failing 1000		6.75 Inches
Site Coordinates, UTM in ft.:	**Total Depth (ft-bgl):**	**Surface Elevation(ft)**	**TOC Elevation(ft)**	**PAD Elevation(ft)**
N: 243560.9400 E: 793756.8200	130.00	2474.58	2477.59	2474.83
Datum Description Source:	**Datum Elev. (ft):**	**Water Level Depth Below Grade(ft):**	**Date:**	**Time:**

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				1–9		Windblown Silty Sand Sediment - Dry, Loose, Black
				10–49		Clayey Sand (SC) - Very fine to fine grained, quartz, 40% clay, compact, damp, reddish orange brown
				10–49		Silty Sand (SM) - Very fine to fine grained, 20% silt, quartz, loose, dry, pinkish tan
				20–49		Silty Sand (SM) - Similar to above, 20-30% silt
				30–49		Silty Sand (SM) - Similar to above
				40–49		Silty Sand (SM) - Similar to above



WELL 01858 1/13/98

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WELL CONSTRUCTION LOG

WELL NO. MW-214A

Client:		Start Date:	End Date:	Page of
FINA OIL AND CHEMICAL COMPANY		2-3-97	2-3-97	2 3
Site:		**Drilling Method:**		**Project Number:**
EAST BOUNDARY INVESTIGATION - BIG SPRING, TEXAS		Air/ Wet Rotary		50-01858.15
Geologist:	**Driller:**	**Drill Rig Type:**		**Borehole Diameter:**
Tracy Payne	Choate Well Service	Failing 1000		6.75 Inches
Site Coordinates, UTM in ft.:	**Total Depth (ft-bgl):**	**Surface Elevation(ft)**	**TOC Elevation(ft)**	**PAD Elevation(ft)**
N: 243560.9400 E: 793756.8200	130.00	2474.58	2477.59	2474.83
Datum Description Source:	**Datum Elev. (ft):**	**Water Level Depth Below Grade(ft):**	**Date:**	**Time:**

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				51–99		Silty Sand (SM) - Very fine to fine grained, 30% silt, quartz, loose, dry, pinkish tan, occasional sandstone nodules
						Silty Sand (SM) - Similar to above
						Silty Sand (SM) - Similar to above
						Damp at 75 feet
		▽				Saturation at 79 feet
						Silty Sand (SM) - Similar to above, saturated, odor, occasional sandstone nodules, sheen noted on produced water
						Silty Sand (SM) - Similar to above, odor becomes stronger with depth

Cement

2-inch Schedule 40 PVC Casing

WELL 01858 1/13/98

F-204A Austin (8-95)

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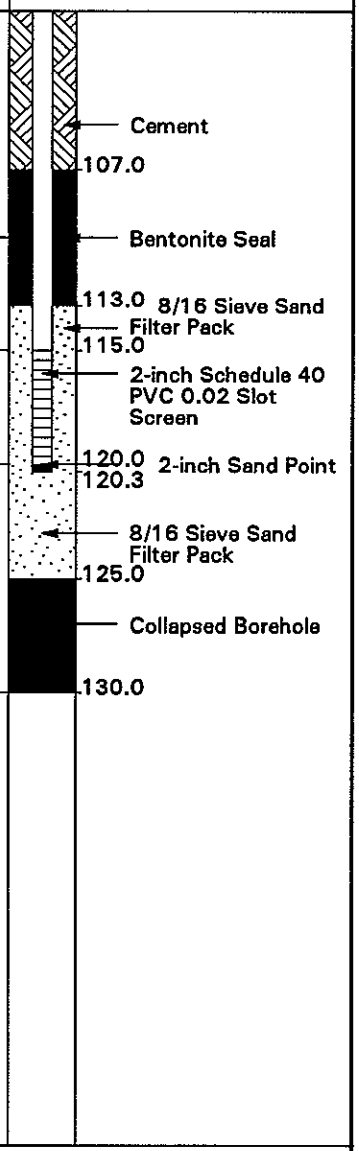
WELL CONSTRUCTION LOG

WELL NO. MW-214A

Client:		Start Date:	End Date:	Page of
FINA OIL AND CHEMICAL COMPANY		2-3-97	2-3-97	3 3
Site:		Drilling Method:		Project Number:
EAST BOUNDARY INVESTIGATION - BIG SPRING, TEXAS		Air/ Wet Rotary		50-01858.15
Geologist:	Driller:	Drill Rig Type:		Borehole Diameter:
Tracy Payne	Choate Well Service	Failing 1000		6.75 Inches
Site Coordinates, UTM in ft.:	Total Depth (ft-bgl):	Surface Elevation(ft)	TOC Elevation(ft)	PAD Elevation(ft)
N: 243560.9400 E: 793756.8200	130.00	2474.58	2477.59	2474.83
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				101–109		Silty Sand (SM) - Very fine to fine grained, 30% silt, quartz, loose, odor, saturated, pinkish tan
				110–114		Sandy Clay (CL) - Low plasticity, 50% sand, very soft, reddish brown, saturated, odor
				115–119		Sandy Gravel (GW) - Well graded, large granule gravel, (platy), sub-angular, saturated, fine to medium grained sand, quartz, 30-40% sand, odor
				120–129		Clay (CH) - Moderate plasticity, firm, dry, reddish brown, Dockum Formation
				130		BORING TERMINATED AT 130 FEET BELOW GRADE
				131–149		



WELL 01858 1/13/98

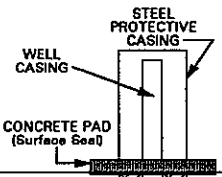
F-204A Austin (8-95)

WELL CONSTRUCTION LOG

WELL NO. MW-215

Client:		Start Date:	End Date:	Page of
FINA OIL AND CHEMICAL COMPANY		2-4-97	2-4-97	1 3
Site:		**Drilling Method:**		**Project Number:**
EAST BOUNDARY INVESTIGATION - BIG SPRING, TEXAS		Air/ Wet Rotary		50-01858.15
Geologist:	**Driller:**	**Drill Rig Type:**		**Borehole Diameter:**
Tracy Payne	Choate Well Service	Failing 1000		6.75 Inches
Site Coordinates, UTM in ft.:	**Total Depth (ft-bgl):**	**Surface Elevation(ft)**	**TOC Elevation(ft)**	**PAD Elevation(ft)**
N: 243253.3200 E: 795273.0700	115.00	2480.19	2483.17	2480.44
Datum Description Source:	**Datum Elev. (ft):**	**Water Level Depth Below Grade(ft):**	**Date:**	**Time:**

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				1–49		Windblown Silty Sand Mixed with Carbon Black Sediment - Dry, loose at surface, compact from 6-24 inches Silty Sand (SM) - Fine to very fine grained, 40% silt, quartz, compact to dense, dry, reddish orange brown Caliche (LS) - White, dense Silty Sand (SM) - Fine to very fine grained, 20% silt, quartz, compact, dry, pinkish tan Silty Sand (SM) - Similar to above Silty Sand (SM) - Similar to above Silty Sand (SM) - Similar to above



WELL 01858 1/13/98

F-204A Austin (8-95)

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WELL CONSTRUCTION LOG

WELL NO. MW-215

Client:		Start Date:	End Date:	Page of
FINA OIL AND CHEMICAL COMPANY		2-4-97	2-4-97	2 3
Site:		**Drilling Method:**		**Project Number:**
EAST BOUNDARY INVESTIGATION - BIG SPRING, TEXAS		Air/ Wet Rotary		50-01858.15
Geologist:	**Driller:**	**Drill Rig Type:**		**Borehole Diameter:**
Tracy Payne	Choate Well Service	Failing 1000		6.75 Inches
Site Coordinates, UTM in ft.:	**Total Depth (ft-bgl):**	**Surface Elevation(ft)**	**TOC Elevation(ft)**	**PAD Elevation(ft)**
N: 243253.3200 E: 795273.0700	115.00	2480.19	2483.17	2480.44
Datum Description Source:	**Datum Elev. (ft):**	**Water Level Depth Below Grade(ft):**	**Date:**	**Time:**

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				51–99		Silty Sand (SM) - Fine to very fine grained. 20% silt, quartz, compact, dry, pinkish tan, sandstone seam with moderate cementation
						Silty Sand (SM) - Similar to above
						Silty Sand (SM) - Similar to above
						Silty Sand (SM) - Similar to above
						Damp at 85 feet
		▽				Silty Sand (SM) - Similar to above, odor
						Saturation at 92 feet

Cement

2-inch Schedule 40 PVC Casing

77.0

Bentonite Seal

82.0

8/16 Sieve Sand Filter Pack

91.0

WELL 01858 1/13/98

F-204A Austin (8-95)

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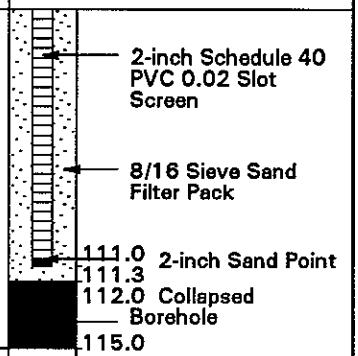
WELL CONSTRUCTION LOG

WELL NO. MW-215

Client:		Start Date:	End Date:	Page of
FINA OIL AND CHEMICAL COMPANY		2-4-97	2-4-97	3 3
Site:		**Drilling Method:**		**Project Number:**
EAST BOUNDARY INVESTIGATION - BIG SPRING, TEXAS		Air/ Wet Rotary		50-01858.15
Geologist:	**Driller:**	**Drill Rig Type:**		**Borehole Diameter:**
Tracy Payne	Choate Well Service	Failing 1000		6.75 Inches
Site Coordinates, UTM in ft.:	**Total Depth (ft-bgl):**	**Surface Elevation(ft)**	**TOC Elevation(ft)**	**PAD Elevation(ft)**
N: 243253.3200 E: 795273.0700	115.00	2480.19	2483.17	2480.44
Datum Description Source:	**Datum Elev. (ft):**	**Water Level Depth Below Grade(ft):**	**Date:**	**Time:**

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				101–115		Silty Sand (SM) - Fine to very fine grained, 20% silt, quartz, compact, saturated, pinkish tan
				111–115		Silty Sand (SM) - Similar to above with interbedded sandstone- dense, moderately-well cemented, pinkish tan
				115		BORING TERMINATED AT 115 FEET BELOW GRADE



WELL 01858 1/13/98

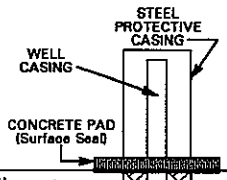
F-204A Austin (8-95)

WELL CONSTRUCTION LOG

WELL NO. MW-215A

Client:		Start Date:	End Date:	Page of
FINA OIL AND CHEMICAL COMPANY		1-28-97	1-28-97	1 3
Site:		**Drilling Method:**		**Project Number:**
EAST BOUNDARY INVESTIGATION - BIG SPRING, TEXAS		Air/ Wet Rotary		50-01858.15
Geologist:	**Driller:**	**Drill Rig Type:**		**Borehole Diameter:**
Tracy Payne	Choate Well Service	Failing 1000		6.75 Inches
Site Coordinates, UTM in ft.:	**Total Depth (ft-bgl):**	**Surface Elevation(ft)**	**TOC Elevation(ft)**	**PAD Elevation(ft)**
N: 243256.2100 E: 795286.9800	130.00	2480.44	2483.42	2480.69
Datum Description Source:	**Datum Elev. (ft):**	**Water Level Depth Below Grade(ft):**	**Date:**	**Time:**

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				1–49		Windblown Silty Sand Mixed with Carbon Black Sediment - Dry, loose at surface, compact from 6-24 inches Silty Sand (SM) - Fine to very fine grained, 40% silt, quartz, compact to dense, dry, dark reddish orange brown Caliche (LS) - White, dense Silty Sand (SM) - Fine to very fine grained, 20% silt, quartz, compact, dry, pinkish tan Silty Sand (SM) - Similar to above Silty Sand (SM) - Similar to above Silty Sand (SM) - Similar to above



WELL 01858 1/13/98

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WELL CONSTRUCTION LOG

WELL NO. MW-215A

Client:		Start Date:	End Date:	Page of
FINA OIL AND CHEMICAL COMPANY		1-28-97	1-28-97	2 3
Site:		**Drilling Method:**		**Project Number:**
EAST BOUNDARY INVESTIGATION - BIG SPRING, TEXAS		Air/ Wet Rotary		50-01858.15
Geologist:	**Driller:**	**Drill Rig Type:**		**Borehole Diameter:**
Tracy Payne	Choate Well Service	Failing 1000		6.75 Inches
Site Coordinates, UTM in ft.:	**Total Depth (ft-bgl):**	**Surface Elevation(ft)**	**TOC Elevation(ft)**	**PAD Elevation(ft)**
N: 243256.2100 E: 795286.9800	130.00	2480.44	2483.42	2480.69
Datum Description Source:	**Datum Elev. (ft):**	**Water Level Depth Below Grade(ft):**	**Date:**	**Time:**

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				51–99		Silty Sand (SM) - Fine to very fine grained. 20% silt, quartz, compact, dry, pinkish tan Silty Sand (SM) - Similar to above with occasional sandstone nodules, dry Silty Sand (SM) - Similar to above Silty Sand (SM) - Similar to above Damp at 85 feet Silty Sand (SM) - Similar to above, faint odor Saturation at 92 feet

Cement

2-inch Schedule 40 PVC Casing

WELL 01858 1/13/98

F-204A Austin (8-95)

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WELL CONSTRUCTION LOG

WELL NO. MW-215A

Client:		Start Date:	End Date:	Page of
FINA OIL AND CHEMICAL COMPANY		1-28-97	1-28-97	3 3
Site:		**Drilling Method:**		**Project Number:**
EAST BOUNDARY INVESTIGATION - BIG SPRING, TEXAS		Air/ Wet Rotary		50-01858.15
Geologist:	**Driller:**	**Drill Rig Type:**		**Borehole Diameter:**
Tracy Payne	Choate Well Service	Failing 1000		6.75 Inches
Site Coordinates, UTM in ft.:	**Total Depth (ft-bgl):**	**Surface Elevation(ft)**	**TOC Elevation(ft)**	**PAD Elevation(ft)**
N: 243256.2100 E: 795286.9800	130.00	2480.44	2483.42	2480.69
Datum Description Source:	**Datum Elev. (ft):**	**Water Level Depth Below Grade(ft):**	**Date:**	**Time:**

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				101–115		Silty Sand (SM) - Fine to very fine grained, 20% silt, quartz, compact, saturated, pinkish tan
				115–125		Silty Sand (SM) - Similar to above with interbedded sandstone- dense, moderately-well cemented, pinkish tan
				115–125		Sandy Clay (CL) - Low plasticity, soft, saturated, pinkish tan, 40% fine grained quartz sand
				118–125		Sandy Clay (CL) - Similar to above, saturated
				125–128		Gravel (GP) - Poorly graded with large granule sized gravel, <5% pebble sized, loose, subrounded to subangular, saturated, quartz, chert
				128–130		Clay (CH) - Moderate plasticity, soft, dry, dark reddish brown, Dockum Formation
				130		BORING TERMINATED AT 130 FEET BELOW GRADE

118.5 Bentonite Seal
121.0 8/16 Sieve Sand Filter Pack
123.0 2-inch Schedule 40 PVC 0.02 Slot Screen
128.0 2-inch Sand Point
128.3
130.0 Collapsed Borehole

WELL 01858 1/13/98

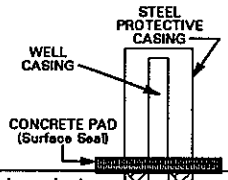
F-204A Austin (8-95)

WELL CONSTRUCTION LOG

WELL NO. MW-218

Client:		Start Date:	End Date:	Page of
FINA OIL AND CHEMICAL COMPANY		2-5-97	2-5-97	1 3
Site:		**Drilling Method:**		**Project Number:**
EAST BOUNDARY INVESTIGATION - BIG SPRING, TEXAS		Air/ Wet Rotary		50-01858.15
Geologist:	**Driller:**	**Drill Rig Type:**		**Borehole Diameter:**
Tracy Payne	Choate Well Service	Failing 1000		6.75 Inches
Site Coordinates, UTM in ft.:	**Total Depth (ft-bgl):**	**Surface Elevation(ft)**	**TOC Elevation(ft)**	**PAD Elevation(ft)**
N: 241950.8700 E: 794588.7100	105.00	2464.84	2468.14	2465.09
Datum Description Source:	**Datum Elev. (ft):**	**Water Level Depth Below Grade(ft):**	**Date:**	**Time:**

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				1–9		Silty Clay (CL) - Moderate plasticity, 20% silt, firm, dry, dark brown
				1–9		Silty Clay (CL) - Similar to above, except damp and reddish brown, 30% silt
				10–19		Silty Sand (SM) - Fine to very fine grained, quartz, 30-40% silt, compact, dry, pinkish tan
				20		Caliche (LS) - Fine grained, grey to whitish pink, dense
				20–49		Silty Sand (SM) - Fine to very fine grained, quartz, 30-40% silt, compact, dry, pinkish tan
				30–49		Silty Sand (SM) - Similar to above, 20-30% silt, reddish tan
				40–49		Silty Sand (SM) - Similar to above



WELL 01858 1/13/98

F-204A Austin (8-95)

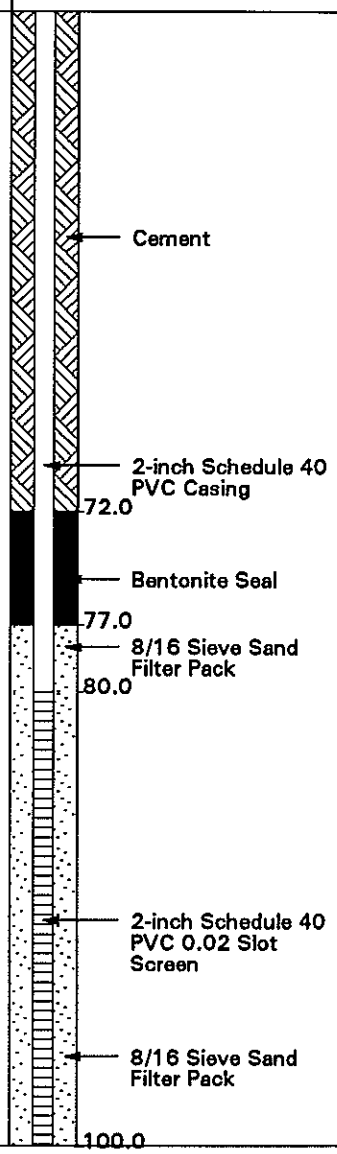
Continued Next Page

WELL CONSTRUCTION LOG

WELL NO. MW-218

Client:		Start Date:	End Date:	Page of
FINA OIL AND CHEMICAL COMPANY		2-5-97	2-5-97	2 3
Site:		**Drilling Method:**		**Project Number:**
EAST BOUNDARY INVESTIGATION - BIG SPRING, TEXAS		Air/ Wet Rotary		50-01858.15
Geologist:	**Driller:**	**Drill Rig Type:**		**Borehole Diameter:**
Tracy Payne	Choate Well Service	Failing 1000		6.75 Inches
Site Coordinates, UTM in ft.:	**Total Depth (ft-bgl):**	**Surface Elevation(ft)**	**TOC Elevation(ft)**	**PAD Elevation(ft)**
N: 241950.8700 E: 794588.7100	105.00	2464.84	2468.14	2465.09
Datum Description Source:	**Datum Elev. (ft):**	**Water Level Depth Below Grade(ft):**	**Date:**	**Time:**

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				51–99		Silty Sand (SM) - Fine to very fine grained, quartz, 20-30% silt, compact, dry, reddish tan.
						Silty Sand (SM) - Similar to above
						Silty Sand (SM) - Similar to above, damp to moist at base
		▽				Silty Sand (SM) - Fine grained, quartz, 20% silt, firm, moist, reddish, tan Saturation at 81 feet
						Silty Sand (SM) - Similar to above, saturated



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F-204A Austin (8-95)

Continued Next Page

WELL CONSTRUCTION LOG

WELL NO. MW-218

Client:		Start Date:	End Date:	Page of
FINA OIL AND CHEMICAL COMPANY		2-5-97	2-5-97	3 3
Site:		**Drilling Method:**		**Project Number:**
EAST BOUNDARY INVESTIGATION - BIG SPRING, TEXAS		Air/ Wet Rotary		50-01858.15
Geologist:	**Driller:**	**Drill Rig Type:**		**Borehole Diameter:**
Tracy Payne	Choate Well Service	Failing 1000		6.75 Inches
Site Coordinates, UTM in ft.:	**Total Depth (ft-bgl):**	**Surface Elevation(ft)**	**TOC Elevation(ft)**	**PAD Elevation(ft)**
N: 241950.8700 E: 794588.7100	105.00	2464.84	2468.14	2465.09
Datum Description Source:	**Datum Elev. (ft):**	**Water Level Depth Below Grade(ft):**	**Date:**	**Time:**

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				101		Silty Sand (SM) - Fine grained, quartz, 20% silt, firm, saturated, reddish tan
				102		
				103		
				104		
				105		
				106		BORING TERMINATED AT 105 FEET BELOW GRADE
				107		
				108		
				109		
				110		
				111		
				112		
				113		
				114		
				115		
				116		
				117		
				118		
				119		
				120		
				121		
				122		
				123		
				124		
				125		
				126		
				127		
				128		
				129		
				130		
				131		
				132		
				133		
				134		
				135		
				136		
				137		
				138		
				139		
				140		
				141		
				142		
				143		
				144		
				145		
				146		
				147		
				148		
				149		

100.3 2-inch Sand Point
101.0
Collapsed Borehole
105.0

WELL 01858 1/13/98

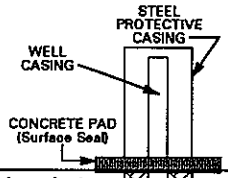
F-204A Austin (8-95)

WELL CONSTRUCTION LOG

WELL NO. MW-218A

Client:		Start Date:	End Date:	Page of
FINA OIL AND CHEMICAL COMPANY		1-17-97	1-17-97	1 3
Site:		**Drilling Method:**		**Project Number:**
EAST BOUNDARY INVESTIGATION - BIG SPRING, TEXAS		Air/ Wet Rotary		50-01858.15
Geologist:	**Driller:**	**Drill Rig Type:**		**Borehole Diameter:**
Tracy Payne	Choate Well Service	Failing 1000		6.75 Inches
Site Coordinates, UTM in ft.:	**Total Depth (ft-bgl):**	**Surface Elevation(ft)**	**TOC Elevation(ft)**	**PAD Elevation(ft)**
N: 241951.5100 E: 794600.3000	130.00	2464.82	2467.84	2465.07
Datum Description Source:	**Datum Elev. (ft):**	**Water Level Depth Below Grade(ft):**	**Date:**	**Time:**

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				1–9		Silty Clay (CL) - Moderate plasticity, 20% silt, firm, dry, dark brown
				1–9		Silty Clay (CL) - Similar to above, except damp and reddish brown, 30% silt
				10–19		Silty Sand (SM) - Fine to very fine grained, quartz, 30-40% silt, compact, dry, pinkish tan
				20		Caliche (LS) - Fine grained, grey to whitish pink
				20–49		Silty Sand (SM) - Fine to very fine grained, quartz, 30-40% silt, compact, dry, pinkish tan
				30–31		Silty Sand (SM) - Similar to above, 20-30% silt, reddish tan
				40–41		Silty Sand (SM) - Similar to above



WELL 01868 1/13/98

F-204A Austin (8-95)

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WELL CONSTRUCTION LOG

WELL NO. MW-218A

Client:		Start Date:	End Date:	Page of
FINA OIL AND CHEMICAL COMPANY		1-17-97	1-17-97	2 3
Site:		**Drilling Method:**		**Project Number:**
EAST BOUNDARY INVESTIGATION - BIG SPRING, TEXAS		Air/ Wet Rotary		50-01858.15
Geologist:	**Driller:**	**Drill Rig Type:**		**Borehole Diameter:**
Tracy Payne	Choate Well Service	Failing 1000		6.75 Inches
Site Coordinates, UTM in ft.:	**Total Depth (ft-bgl):**	**Surface Elevation(ft)**	**TOC Elevation(ft)**	**PAD Elevation(ft)**
N: 241951.5100 E: 794600.3000	130.00	2464.82	2467.84	2465.07
Datum Description Source:	**Datum Elev. (ft):**	**Water Level Depth Below Grade(ft):**	**Date:**	**Time:**

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				51–99		Silty Sand (SM) - Fine to very fine grained, quartz, 20-30% silt, compact, dry, reddish tan.
						Silty Sand (SM) - Similar to above
						Silty Sand (SM) - Similar to above, damp to moist at base
		▽				Silty Sand (SM) - Fine grained, quartz, 20% silt, firm, moist, reddish tan Saturation at 81 feet
						Silty Sand (SM) - Similar to above, saturated

Cement

2-inch Schedule 40 PVC Casing

99.0

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F-204A Austin (8-95)

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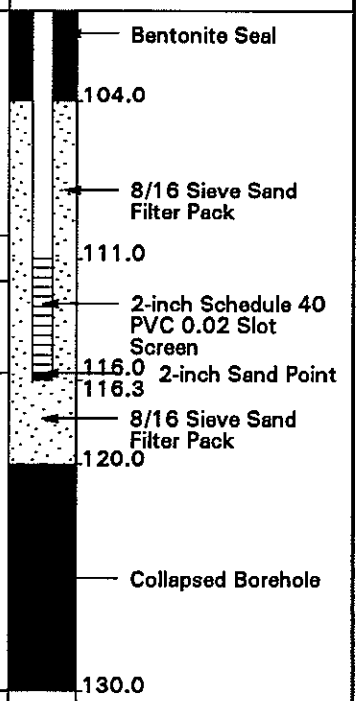
WELL CONSTRUCTION LOG

WELL NO. MW-218A

Client:		Start Date:	End Date:	Page of
FINA OIL AND CHEMICAL COMPANY		1-17-97	1-17-97	3 3
Site:		**Drilling Method:**		**Project Number:**
EAST BOUNDARY INVESTIGATION - BIG SPRING, TEXAS		Air/ Wet Rotary		50-01858.15
Geologist:	**Driller:**	**Drill Rig Type:**		**Borehole Diameter:**
Tracy Payne	Choate Well Service	Failing 1000		6.75 Inches
Site Coordinates, UTM in ft.:	**Total Depth (ft-bgl):**	**Surface Elevation(ft)**	**TOC Elevation(ft)**	**PAD Elevation(ft)**
N: 241951.5100 E: 794600.3000	130.00	2464.82	2467.84	2465.07
Datum Description Source:	**Datum Elev. (ft):**	**Water Level Depth Below Grade(ft):**	**Date:**	**Time:**

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				101–109		Silty Sand (SM) - Fine grained, quartz, 20% silt, firm, saturated, reddish tan
				110–112		Silty Clay (CL) - Low plasticity, very soft, saturated, reddish brown
				113–116		Clayey Gravel (GC) - Low plasticity, very soft clay, granule to pebble sized gravel, angular, quartz, chert, limestone, shell fragments, saturated
				117–129		Clay (CH) - Moderate plasticity, soft, dry, dark reddish brown, traces of grey colored clay, Dockum Formation Clay (CH) - Similar to above
				130–149		BORING TERMINATED AT 130 FEET BELOW GRADE NOTE: 2 1/2" blank at top of screen and 4 3/4" blank at bottom of screen



WELL 01858 1/13/98

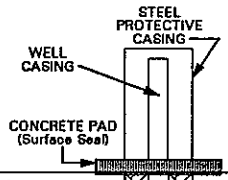
F-204A Austin (8-95)

WELL CONSTRUCTION LOG

WELL NO. MW-220

Client:		Start Date:	End Date:	Page of
Fina Oil and Chemical Co.		11-19-97	11-19-97	1 3
Site:		**Drilling Method:**		**Project Number:**
Northweast Boundary Investigation, Big Spring		Air/Wet Rotary		50-01858.26
Geologist:	**Driller:**	**Drill Rig Type:**		**Borehole Diameter:**
Tracy Payne	Choate Well Service	Failing 1000		6.75 Inches
Site Coordinates, UTM in ft.:	**Total Depth (ft-bgl):**	**Surface Elevation(ft)**	**TOC Elevation(ft)**	**PAD Elevation(ft)**
N: 244721.8000 E: 792847.7700	115.00		2492.53	2489.69
Datum Description Source:	**Datum Elev. (ft):**	**Water Level Depth Below Grade(ft):**	**Date:**	**Time:**

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				1–9		Silty Sand(SM) Fine grained, poorly graded, subangular, compact, dry, dark brown 0-1, grades to a reddish brown.
				10–19		Clayey Sand(SC) 10% clay, soft, damp, fine grained, poorly graded, compact, orangish red.
				20–29		Silty Sand(SM) 10-20% silt, very fine to fine grained, poorly graded, subrounded, compact, dry, light orangish tan.
				30–39		Silty Sand(SM) Similar to above.
				40–49		Silty Sand(SM) Similar to above.



Cement/Bentonite Grout

2-inch PVC Casing

WELL 18586 1/13/98

F-204A Austin (8-95)

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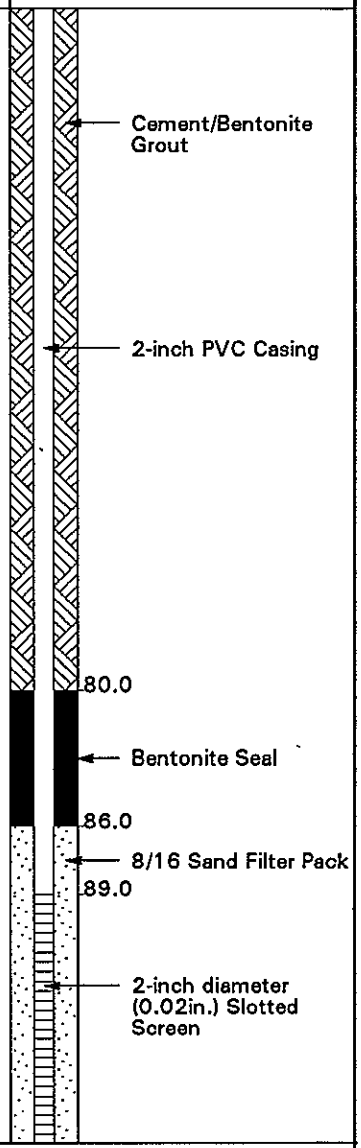
WELL CONSTRUCTION LOG

WELL NO. MW-220

Client:		Start Date:	End Date:	Page of
Fina Oil and Chemical Co.		11-19-97	11-19-97	2 3
Site:		Drilling Method:		Project Number:
Northweast Boundary Investigation, Big Spring		Air/Wet Rotary		50-01858.26
Geologist:	Driller:	Drill Rig Type:		Borehole Diameter:
Tracy Payne	Choate Well Service	Failing 1000		6.75 Inches
Site Coordinates, UTM in ft.:	Total Depth (ft-bgl):	Surface Elevation(ft)	TOC Elevation(ft)	PAD Elevation(ft)
N: 244721.8000 E: 792847.7700	115.00		2492.53	2489.69
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				51–99		Silty Sand(SM) 20-30% silt, very fine to fine grained, poorly graded, subrounded, compact, dry, light pinkish tan.
						Silty Sand(SM) Similar to above, tan.
						Silty Sand(SM) Similar to above.
						Silty Sand(SM) Similar to above, damp at base.
						Silty Sand(SM) Similar to above, damp to moist.
		▽				Silty Sand(SM) Similar to above, saturated at 90 feet.



WELL 18586 1/13/98

F-204A Austin (8-95)

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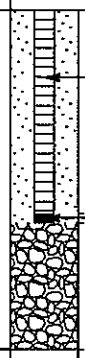
WELL CONSTRUCTION LOG

WELL NO. MW-220

Client:		Start Date:	End Date:	Page of
Fina Oil and Chemical Co.		11-19-97	11-19-97	3 3
Site:		**Drilling Method:**		**Project Number:**
Northweast Boundary Investigation, Big Spring		Air/Wet Rotary		50-01858.26
Geologist:	**Driller:**	**Drill Rig Type:**		**Borehole Diameter:**
Tracy Payne	Choate Well Service	Failing 1000		6.75 Inches
Site Coordinates, UTM in ft.:	**Total Depth (ft-bgl):**	**Surface Elevation(ft)**	**TOC Elevation(ft)**	**PAD Elevation(ft)**
N: 244721.8000 E: 792847.7700	115.00		2492.53	2489.69
Datum Description Source:	**Datum Elev. (ft):**	**Water Level Depth Below Grade(ft):**	**Date:**	**Time:**

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				101–115		Silty Sand(SM) 20-30% silt, very fine to fine grained, poorly graded, subrounded, compact, saturated, tan.
				101–115		Silty Sand(SM) Similar to above.
				115–149		BORING TERMINATED AT 115 FEET BELOW GRADE



WELL 18586 1/13/98

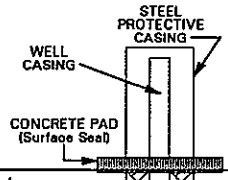
F-204A Austin (8-95)

WELL CONSTRUCTION LOG

WELL NO. MW-220A

Client:		Start Date:	End Date:	Page of
Fina Oil and Chemical Co.		10-31-97	10-31-97	1 3
Site:		**Drilling Method:**		**Project Number:**
Northweast Boundary Investigation, Big Spring		Air/Wet Rotary		50-01858.26
Geologist:	**Driller:**	**Drill Rig Type:**		**Borehole Diameter:**
Tracy Payne	Choate Well Service	Failing 1000		6.75 Inches
Site Coordinates, UTM in ft.:	**Total Depth (ft-bgl):**	**Surface Elevation(ft)**	**TOC Elevation(ft)**	**PAD Elevation(ft)**
N: 244737.0400 E: 792839.0000	140.00		2492.95	2490.28
Datum Description Source:	**Datum Elev. (ft):**	**Water Level Depth Below Grade(ft):**	**Date:**	**Time:**

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				1–9		Silty Sand(SM) Fine grained, poorly graded, subangular, compact, dry, dark brown 0-1 foot, grades to a reddish brown.
				10–20		Clayey Sand(SC) 10% clay, soft, damp, fine grained, poorly grade, compact, orangish red.
				20–30		Silty Sand(SM) 10-20% silt, very fine to fine grained, poorly graded, subrounded, compact, dry, light orangish tan.
				30–40		Silty Sand(SM) Similar to above.
				40–49		Silty Sand(SM) Similar to above.



Cement/Bentonite Grout

2-inch PVC Casing

WELL 18586 1/13/98

F-204A Austin (8-95)

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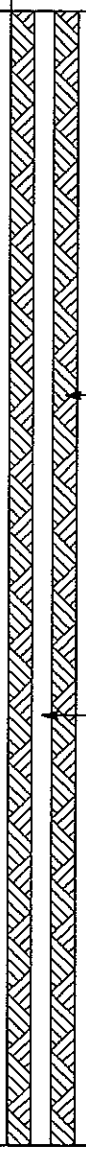
WELL CONSTRUCTION LOG

WELL NO. MW-220A

Client:		Start Date:	End Date:	Page of
Fina Oil and Chemical Co.		10-31-97	10-31-97	2 3
Site:		Drilling Method:		Project Number:
Northweast Boundary Investigation, Big Spring		Air/Wet Rotary		50-01858.26
Geologist:	Driller:	Drill Rig Type:		Borehole Diameter:
Tracy Payne	Choate Well Service	Failing 1000		6.75 Inches
Site Coordinates, UTM in ft.:	Total Depth (ft-bgl):	Surface Elevation(ft)	TOC Elevation(ft)	PAD Elevation(ft)
N: 244737.0400 E: 792839.0000	140.00		2492.95	2490.28
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				51–99		Silty Sand(SM) 20-30% silt, very fine to fine grained, poorly graded, subrounded, compact, dry, light pinkish tan.
						Silty Sand(SM) Similar to above, tan.
						Silty Sand(SM) Similar to above.
						Silty Sand(SM) Similar to above, damp at base.
						Silty Sand(SM) Similar to above, damp to moist.
						Silty Sand(SM) Similar to above, moist, saturated at 95 feet.



WELL 18586 1/13/98

F-204A Austin (8-95)

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WELL CONSTRUCTION LOG

WELL NO. MW-220A

Client: Fina Oil and Chemical Co.		Start Date: 10-31-97	End Date: 10-31-97	Page 3 of 3
Site: Northweast Boundary Investigation, Big Spring		Drilling Method: Air/Wet Rotary		Project Number: 50-01858.26
Geologist: Tracy Payne	Driller: Choate Well Service	Drill Rig Type: Failing 1000		Borehole Diameter: 6.75 Inches
Site Coordinates, UTM in ft.: N: 244737.0400 E: 792839.0000	Total Depth (ft-bgl): 140.00	Surface Elevation(ft)	TOC Elevation(ft) 2492.95	PAD Elevation(ft) 2490.28
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				101–120		Silty Sand(SM) 20-30% silt, very fine to fine grained, poorly graded, subrounded, compact, dry, tan, saturated.
				111–119		Silty Sand(SM) Similar to above, sandstone seam at 118-119 feet
				120–121		Sandstone Seam(SS) Seam, well cemented, dense.
				122–128		Silty Sand(SM) Similar to above, saturated.
				125–127		Silty Sand(SM) Similar to above, saturated.
				128–130		Clay(CL) Low plasticity, soft, slightly sandy, light reddish brown, saturated.
				130–135		Gravel(GP) Large granule to small pebbles, subrounded, compact, chert, quartz, saturated.
				135–140		Clay(CH) High plasticity, firm to soft, dry, dark reddish brown/gray, Dockum Formation.
				140		BORING TERMINATED AT 140 FEET BELOW GRADE

Cement/Bentonite Grout
2-inch PVC Casing
122.0
Bentonite Seal
127.0
Sand Filter Pack
130.0
2-inch diameter (0.02in.) Slotted Screen
135.0
135.3 PVC Cap
140.0

WELL 18686 1/13/98

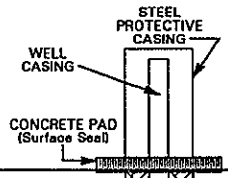
F-204A Austin (8-95)

WELL CONSTRUCTION LOG

WELL NO. MW-221

Client: Fina Oil and Chemical Co.		Start Date: 11-17-97	End Date: 11-17-97	Page 1 of 3
Site: Northweast Boundary Investigation, Big Spring		Drilling Method: Air/Wet Rotary		Project Number: 50-01858.26
Geologist: Tracy Payne	Driller: Choate Well Service	Drill Rig Type: Failing 1000		Borehole Diameter: 6.75 Inches
Site Coordinates, UTM in ft.: N: 245810.8600 E: 791199.3800	Total Depth (ft-bgl): 130.00	Surface Elevation(ft)	TOC Elevation(ft) 2512.68	PAD Elevation(ft) 2509.72
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				1–49		Sand(SP) Fine grained, subrounded, poorly graded, compact, dry, brown.
						Sand(SP) Similar to above, damp, light brown.
						Sand(SP) Similar to above, damp.
						Sand(SM) Similar to above, damp.
						Silty Sand(SM) 20% silt, very fine grained, subrounded, compact, dry to damp, light brown.



Cement/Bentonite Grout

2-inch PVC Casing

WELL 18586 1/13/98

F-204A Austin (8-95)

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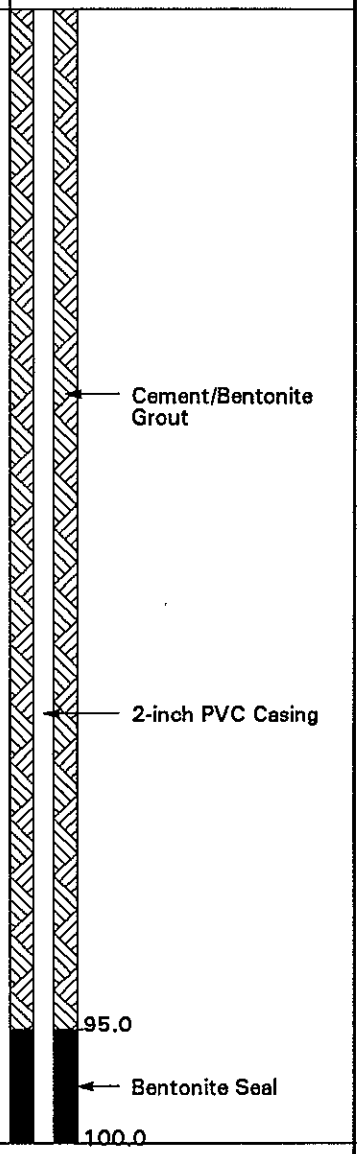
WELL CONSTRUCTION LOG

WELL NO. MW-221

Client:		Start Date:	End Date:	Page of
Fina Oil and Chemical Co.		11-17-97	11-17-97	2 3
Site:		Drilling Method:		Project Number:
Northweast Boundery Investigation, Big Spring		Air/Wet Rotary		50-01858.26
Geologist:	Driller:	Drill Rig Type:		Borehole Diameter:
Tracy Payne	Choate Well Service	Failing 1000		6.75 Inches
Site Coordinates, UTM in ft.:	Total Depth (ft-bgl):	Surface Elevation(ft)	TOC Elevation(ft)	PAD Elevation(ft)
N: 245810.8600 E: 791199.3800	130.00		2512.68	2509.72
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				51–99		Silty Sand(SM) 20% silt, very fine grained, subrounded, poorly graded, compact, dry to damp, light brown becoming tan about 58 feet.
						Silty Sand(SM) Similar to above, dry, 20-30% silt.
						Silty Sand(SM) Similar to above, dry.
						Silty Sand(SM) Similar to above.
						Silty Sand(SM) Similar to above, damp at 100 feet.



WELL 18586 1/13/98

F-204A Austin (8-95)

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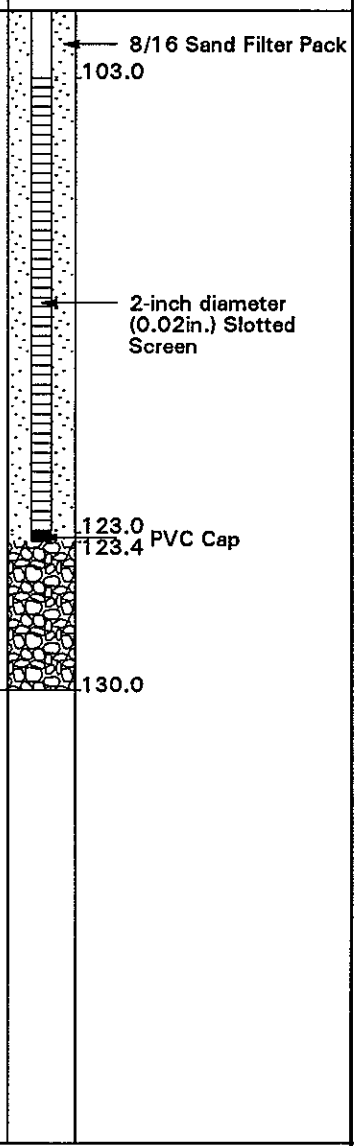
WELL CONSTRUCTION LOG

WELL NO. MW-221

Client:		Start Date:	End Date:	Page of
Fina Oil and Chemical Co.		11-17-97	11-17-97	3 3
Site:		Drilling Method:		Project Number:
Northweast Boundary Investigation, Big Spring		Air/Wet Rotary		50-01858.26
Geologist:	Driller:	Drill Rig Type:		Borehole Diameter:
Tracy Payne	Choate Well Service	Failing 1000		6.75 Inches
Site Coordinates, UTM in ft.:	Total Depth (ft-bgl):	Surface Elevation(ft)	TOC Elevation(ft)	PAD Elevation(ft)
N: 245810.8600 E: 791199.3800	130.00		2512.68	2509.72
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
		▽		101–130		Silty Sand(SM) 20%-30% silt, very fine grained, subrounded, poorly graded, compact, saturated at 104 feet, tan.
						Silty Sand(SM) Similar to above, occasional sandstone seam, saturated.
						Silty Sand(SM) Similar to above.
				130–149		BORING TERMINATED AT 130 FEET BELOW GRADE



WELL 18586 1/13/98

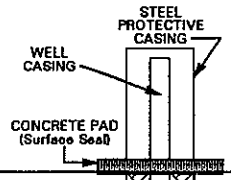
F-204A Austin (8-95)

WELL CONSTRUCTION LOG

WELL NO. MW-221A

Client:		Start Date:	End Date:	Page of
Fina Oil and Chemical Co.		10-28-97	10-28-97	1 4
Site:		Drilling Method:		Project Number:
Northweast Boundary Investigation, Big Spring		Air/Wet Rotary		50-01858.26
Geologist:	Driller:	Drill Rig Type:		Borehole Diameter:
Tracy Payne	Choate Well Service	Failing 1000		6.75 Inches
Site Coordinates, UTM in ft.:	Total Depth (ft-bgl):	Surface Elevation(ft)	TOC Elevation(ft)	PAD Elevation(ft)
N: 245814.6500 E: 791214.7900	160.00		2512.56	2509.66
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				1–9		Sand(SP) Fine grained, subrounded, poorly graded, compact, dry, brown.
				10–19		Sand(SP) Similar to above, damp, light brown.
				20–30		Sand(SP) Similar to above, damp.
				31–39		Sand(SP) Similar to above, damp.
				40–49		Silty Sand(SM) 20% silt, very fine grained, subrounded, poorly graded, compact, dry to damp, light brown.



Cement/Bentonite Grout

2-inch PVC Casing

WELL 18586 1/13/98

F-204A Austin (8-95)

Continued Next Page

WELL CONSTRUCTION LOG

WELL NO. MW-221A

Client:		Start Date:	End Date:	Page of
Fina Oil and Chemical Co.		10-28-97	10-28-97	2 4
Site:		**Drilling Method:**		**Project Number:**
Northweast Boundary Investigation, Big Spring		Air/Wet Rotary		50-01858.26
Geologist:	**Driller:**	**Drill Rig Type:**		**Borehole Diameter:**
Tracy Payne	Choate Well Service	Failing 1000		6.75 Inches
Site Coordinates, UTM in ft.:	**Total Depth (ft-bgl):**	**Surface Elevation(ft)**	**TOC Elevation(ft)**	**PAD Elevation(ft)**
N: 245814.6500 E: 791214.7900	160.00		2512.56	2509.66
Datum Description Source:	**Datum Elev. (ft):**	**Water Level Depth Below Grade(ft):**	**Date:**	**Time:**

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				51–99		Silty Sand(SM) 20% silt, very fine grained, subrounded, poorly graded, compact, dry to damp, light brown becoming tan at 58 feet.
						Silty Sand(SM) Similar to above, dry, 20-30% silt.
						Silty Sand(SM) Similar to above.
						Silty Sand(SM) Similar to above.
						Silty Sand(SM) Similar to above, damp at 100 feet.

Cement/Bentonite Grout

2-inch PVC Casing

WELL 19586 1/13/98

F-204A Austin (8-95)

Continued Next Page

WELL CONSTRUCTION LOG

WELL NO. MW-221A

Client:		Start Date:	End Date:	Page of
Fina Oil and Chemical Co.		10-28-97	10-28-97	3 4
Site:		Drilling Method:		Project Number:
Northweast Boundary Investigation, Big Spring		Air/Wet Rotary		50-01858.26
Geologist:	Driller:	Drill Rig Type:		Borehole Diameter:
Tracy Payne	Choate Well Service	Failing 1000		6.75 Inches
Site Coordinates, UTM in ft.:	Total Depth (ft-bgl):	Surface Elevation(ft)	TOC Elevation(ft)	PAD Elevation(ft)
N: 245814.6500 E: 791214.7900	160.00		2512.56	2509.66
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				101–149		Silty Sand(SM) 20-30% silt, very fine grained, subrounded, poorly graded, compact, damp, tan.
						Silty Sand(SM) Similar to above, saturated at 115 feet, occasional sandstone seam.
						Silty Sand(SM) Similar to above.
						Silty Sand(SM) Similar to above.
						Silty Sand(SM) Similar to above.
						Clayey Gravel(GC) 20-30% low plasticity, soft clay, reddish brown - gravel - poorly graded, subrounded to subangular, compact,

Cement/Bentonite Grout

2-inch PVC Casing

136.0

Bentonite Seal

146.0

Sand Filter Pack

150.0

WELL 18586 1/13/98

F-204A Austin (8-95)

Continued Next Page

WELL CONSTRUCTION LOG

WELL NO. MW-221A

Client:		Start Date:	End Date:	Page of
Fina Oil and Chemical Co.		10-28-97	10-28-97	4 4
Site:		Drilling Method:		Project Number:
Northweast Boundary Investigation, Big Spring		Air/Wet Rotary		50-01858.26
Geologist:	Driller:	Drill Rig Type:		Borehole Diameter:
Tracy Payne	Choate Well Service	Failing 1000		6.75 Inches
Site Coordinates, UTM in ft.:	Total Depth (ft-bgl):	Surface Elevation(ft)	TOC Elevation(ft)	PAD Elevation(ft)
N: 245814.6500 E: 791214.7900	160.00		2512.56	2509.66
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				151		granule, minor amount (<5%) sand, coarse, chert, quartz.
				152		Clayey Gravel(GC) Similar to above.
				153		
				154		
				155		
				156		Clay(CH) High plasticity, soft, dry, dark reddish brown - Dockum Formation.
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				158		
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				160		
				161		BORING TERMINATED AT 160 FEET BELOW GRADE
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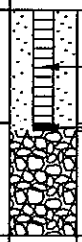


WELL 18586 1/13/98

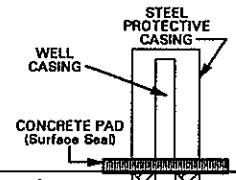
F-204A Austin (8-95)

WELL CONSTRUCTION LOG

WELL NO. MW-223

Client:		Start Date:	End Date:	Page of
Fina Oil and Chemical Co.		10-31-97	10-31-97	1 3
Site:		**Drilling Method:**		**Project Number:**
Northweast Boundary Investigation, Big Spring		Air/Wet Rotary		50-01858.26
Geologist:	**Driller:**	**Drill Rig Type:**		**Borehole Diameter:**
Tracy Payne	Choate Well Service	Failing 1000		6.75 Inches
Site Coordinates, UTM in ft.:	**Total Depth (ft-bgl):**	**Surface Elevation(ft)**	**TOC Elevation(ft)**	**PAD Elevation(ft)**
N: 246138.0300 E: 792439.7100	120.00		2505.30	2502.40
Datum Description Source:	**Datum Elev. (ft):**	**Water Level Depth Below Grade(ft):**	**Date:**	**Time:**

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				1–3		Sand(SP) Fine to very fine grained, subangular, loose, dry, dark brown, poorly graded.
				4–10		Clayey Sand(SM) 20-30% soft clay, fine grained sand, subangular, compact, dry, reddish brown.
				11–12		Caliche/Sand Mix Dense, moderately cemented, dry, light gray to white.
				13–19		Silty Sand(SM) Very fine grained, subangular, 20-30% silt, compact, dry, reddish tan.
				20–22		Caliche White, dense, dry.
				23–29		Silty Sand(SM) Fine to very fine grained, 20-30% silt fines, compact, dry, reddish tan, subrounded grains.
				30–40		Silty Sand(SM) Similar to above.
				41–49		Silty Sand(SM) Similar to above.



WELL 18586 1/13/98

F-204A Austin (8-95)

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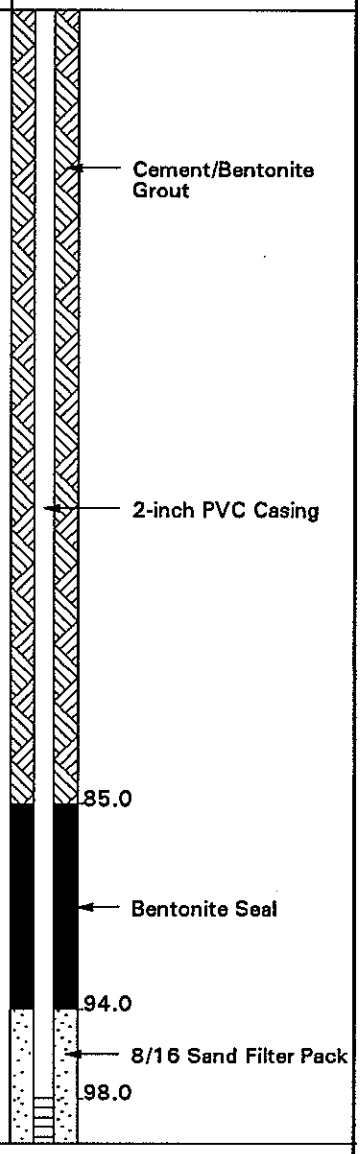
WELL CONSTRUCTION LOG

WELL NO. MW-223

Client:		Start Date:	End Date:	Page of
Fina Oil and Chemical Co.		10-31-97	10-31-97	2 3
Site:		**Drilling Method:**		**Project Number:**
Northweast Boundary Investigation, Big Spring		Air/Wet Rotary		50-01858.26
Geologist:	**Driller:**	**Drill Rig Type:**		**Borehole Diameter:**
Tracy Payne	Choate Well Service	Failing 1000		6.75 Inches
Site Coordinates, UTM in ft.:	**Total Depth (ft-bgl):**	**Surface Elevation(ft)**	**TOC Elevation(ft)**	**PAD Elevation(ft)**
N: 246138.0300 E: 792439.7100	120.00		2505.30	2502.40
Datum Description Source:	**Datum Elev. (ft):**	**Water Level Depth Below Grade(ft):**	**Date:**	**Time:**

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				51–99		Silty Sand(SM) fine to very fine grained, 20-30% silt fines, compact, dry, subrounded grains, grades to a light pinkish tan.
						Silty Sand(SM) Similar to above.
						Silty Sand(SM) Similar to above.
						Silty Sand(SM) Similar to above.
						Silty Sand(SM) Similar to above, saturated at 99 feet.



WELL 18588 1/13/98

F-204A Austin (8-95)

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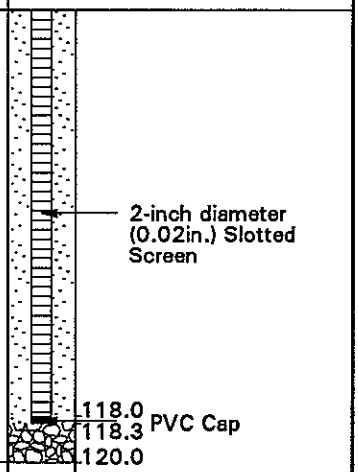
WELL CONSTRUCTION LOG

WELL NO. MW-223

Client:		Start Date:	End Date:	Page of
Fina Oil and Chemical Co.		10-31-97	10-31-97	3 3
Site:		Drilling Method:		Project Number:
Northweast Boundary Investigation, Big Spring		Air/Wet Rotary		50-01858.26
Geologist:	Driller:	Drill Rig Type:		Borehole Diameter:
Tracy Payne	Choate Well Service	Failing 1000		6.75 Inches
Site Coordinates, UTM in ft.:	Total Depth (ft-bgl):	Surface Elevation(ft)	TOC Elevation(ft)	PAD Elevation(ft)
N: 246138.0300 E: 792439.7100	120.00		2505.30	2502.40
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				101–120		Silty Sand(SM) Fine to very fine grained, 20-30% silt fines, compact, dry, pinkish tan, subrounded grains, saturated.
				101–120		Silty Sand(SM) Similar to above.
				120–149		BORING TERMINATED AT 120 FEET BELOW GRADE



WELL 18588 1/13/98

F-204A Austin (8-95)

WELL CONSTRUCTION LOG

WELL NO. MW-223A

Client:		Start Date:	End Date:	Page of
Fina Oil and Chemical Co.		10-30-97	10-30-97	1 4
Site:		**Drilling Method:**		**Project Number:**
Northweast Boundary Investigation, Big Spring		Air/Wet Rotary		50-01858.26
Geologist:	**Driller:**	**Drill Rig Type:**		**Borehole Diameter:**
Tracy Payne	Choate Well Service	Failing 1000		6.75 Inches
Site Coordinates, UTM in ft.:	**Total Depth (ft-bgl):**	**Surface Elevation(ft)**	**TOC Elevation(ft)**	**PAD Elevation(ft)**
N: 246140.8000 E: 792455.5500	150.00		2506.46	2503.74
Datum Description Source:	**Datum Elev. (ft):**	**Water Level Depth Below Grade(ft):**	**Date:**	**Time:**

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				1–49		Sand(SP) Very fine to fine grained, subangular, loose, dry, dark brown, poorly graded.
						Clayey Sand(SC) 20-30% soft clay, fine grained sand, subangular, compact, dry, reddish brown.
						Caliche/Sand Mix Dense, moderately cemented,dry, light gray to white.
						Silty Sand(SM) Very fine grained, subangular, 20-30% silt, compact, dry, reddish tan.
						Silty Sand(SM) Similar to above. Caliche White, dense, dry
						Silty Sand(SM) Similar to 20-21 feet interval.
						Silty Sand(SM) Fine grained, subrounded, poorly graded, 10-20% silt, compact, dry, tan.
						Silty Sand(SM) Similar to above.

STEEL PROTECTIVE CASING
WELL CASING
CONCRETE PAD (Surface Seal)
Cement/Bentonite Grout
2-inch PVC Casing

WELL 18586 1/13/98

F-204A Austin (8-95)

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WELL CONSTRUCTION LOG

WELL NO. MW-223A

Client:		Start Date:	End Date:	Page of
Fina Oil and Chemical Co.		10-30-97	10-30-97	2 4
Site:		Drilling Method:		Project Number:
Northweast Boundary Investigation, Big Spring		Air/Wet Rotary		50-01858.26
Geologist:	Driller:	Drill Rig Type:		Borehole Diameter:
Tracy Payne	Choate Well Service	Failing 1000		6.75 Inches
Site Coordinates, UTM in ft.:	Total Depth (ft-bgl):	Surface Elevation(ft)	TOC Elevation(ft)	PAD Elevation(ft)
N: 246140.8000 E: 792455.5500	150.00		2506.46	2503.74
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				51–99		Silty Sand(SM) Fine grained, subrounded, poorly graded, 10-20% silt, compact, dry, pinkish tan.
						Silty Sand(SM) Similar to above.
						Silty Sand(SM) Similar to above, dry.
						Silty Sand(SM) Similar to above, dry.
						Silty Sand(SM) Similar to above, becoming damp at 90 feet. Moisture increases with depth.

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F-204A Austin (8-95)

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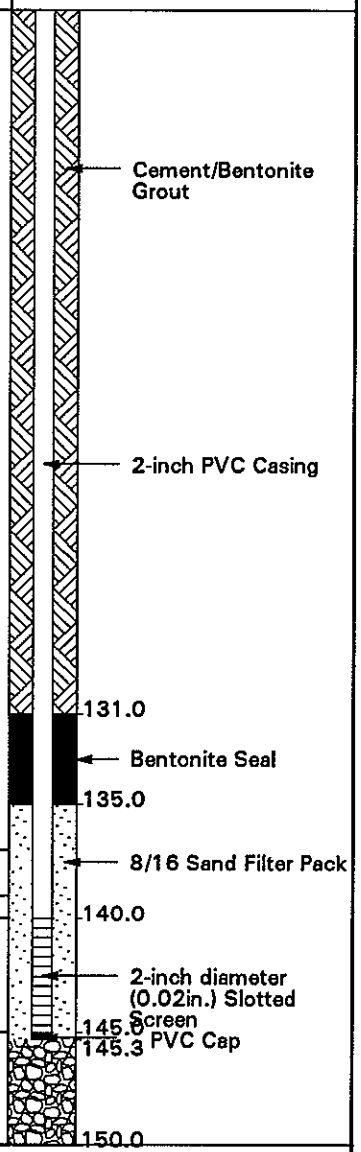
WELL CONSTRUCTION LOG

WELL NO. MW-223A

Client:		Start Date:	End Date:	Page of
Fina Oil and Chemical Co.		10-30-97	10-30-97	3 4
Site:		**Drilling Method:**		**Project Number:**
Northweast Boundary Investigation, Big Spring		Air/Wet Rotary		50-01858.26
Geologist:	**Driller:**	**Drill Rig Type:**		**Borehole Diameter:**
Tracy Payne	Choate Well Service	Failing 1000		6.75 Inches
Site Coordinates, UTM in ft.:	**Total Depth (ft-bgl):**	**Surface Elevation(ft)**	**TOC Elevation(ft)**	**PAD Elevation(ft)**
N: 246140.8000 E: 792455.5500	150.00		2506.46	2503.74
Datum Description Source:	**Datum Elev. (ft):**	**Water Level Depth Below Grade(ft):**	**Date:**	**Time:**

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
		▽		101–149		Silty Sand(SM) Fine grained, subrounded, poorly graded, 10-20% silt, compact, pinkish tan, saturated at 101 feet.
						Silty Sand(SM) Similar to above.
						Silty Sand(SM) Similar to above.
						Silty Sand(SM) Similar to above.
						Clay(CL) Low plasticity, soft, slightly sandy, light reddish brown, saturated.
						Gravel(GP) Large granules, loose, saturated, poorly graded, chert, quartz, shell fragments, subangular.
						Gravel(GP) Similar to above.
						Clay(CH) Moderate to high plasticity, firm, dry, dark reddish brown/gray, Dockum Formation.



WELL 18586 1/13/98

F-204A Austin (8-95)

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WELL CONSTRUCTION LOG

WELL NO. MW-223A

Client:		Start Date:	End Date:	Page of
Fina Oil and Chemical Co.		10-30-97	10-30-97	4 4
Site:		Drilling Method:		Project Number:
Northweast Boundary Investigation, Big Spring		Air/Wet Rotary		50-01858.26
Geologist:	Driller:	Drill Rig Type:		Borehole Diameter:
Tracy Payne	Choate Well Service	Failing 1000		6.75 Inches
Site Coordinates, UTM in ft.:	Total Depth (ft-bgl):	Surface Elevation(ft)	TOC Elevation(ft)	PAD Elevation(ft)
N: 246140.8000 E: 792455.5500	150.00		2506.46	2503.74
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				151		BORING TERMINATED AT 150 FEET BELOW GRADE
				152		
				153		
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WELL 18586 1/13/98

F-204A Austin (8-95)

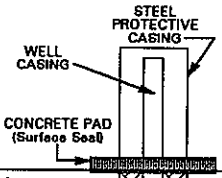
WELL CONSTRUCTION LOG

WELL NO. MW-224

Client: Fina Oil and Chemical Co.	Start Date: 11-17-97	End Date: 11-17-97	Page 1 of 3
Site: Northweast Boundary Investigation, Big Spring	Drilling Method: Air/Wet Rotary		Project Number: 50-01858.26
Geologist: Tracy Payne	Driller: Choate Well Service	Drill Rig Type: Failing 1000	Borehole Diameter: 6.75 Inches
Site Coordinates, UTM in ft.: N: 246794.5100 E: 792342.8700	Total Depth (ft-bgl): 140.00	Surface Elevation(ft)	TOC Elevation(ft): 2521.92 / PAD Elevation(ft): 2519.03
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date: / Time:

Sample Type | Recovery (%) | Saturation | PID (ppm) | Depth (feet) | Stratigraphy

LITHOLOGIC DESCRIPTION



Sand(SP) Fine to very fine grained, subrounded, poorly graded, loose, dry, dark brown.

Clayey Sand(SC) 10-20% clay, soft, fine grained sand, subrounded, compact, damp, reddish brown.

Clayey Sand(SC) Similar to above.

Silty Sand(SM) Fine grained, subrounded, loose, damp, tan, 20% silt.

Silty Sand(SM) Similar to above.

Silty Sand(SM) Similar to above, except reddish tan, 20-30% silt, damp.

Silty Sand(SM) Similar to above, damp.

Silty Sand(SM) Similar to above, increase in silt (40-50%) with very fine grained sand, damp.

Cement/Bentonite Grout

2-inch PVC Casing

WELL 18586 1/13/98

F-204A Austin (8-95)

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WELL CONSTRUCTION LOG

WELL NO. MW-224

Client:		Start Date:	End Date:	Page of
Fina Oil and Chemical Co.		11-17-97	11-17-97	2 3
Site:		**Drilling Method:**		**Project Number:**
Northweast Boundary Investigation, Big Spring		Air/Wet Rotary		50-01858.26
Geologist:	**Driller:**	**Drill Rig Type:**		**Borehole Diameter:**
Tracy Payne	Choate Well Service	Failing 1000		6.75 Inches
Site Coordinates, UTM in ft.:	**Total Depth (ft-bgl):**	**Surface Elevation(ft)**	**TOC Elevation(ft)**	**PAD Elevation(ft)**
N: 246794.5100 E: 792342.8700	140.00		2521.92	2519.03
Datum Description Source:	**Datum Elev. (ft):**	**Water Level Depth Below Grade(ft):**	**Date:**	**Time:**

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				51–99		Silty Sand(SM) Fine grained sand, subrounded, loose, damp, reddish tan, decrease in silt 20-30%.
						Silty Sand(SM) Similar to above, dry, pinkish tan.
						Silty Sand(SM) Similar to above.
						Silty Sand(SM) Similar to above, occasional sandstone seams.
						Silty Sand(SM) Similar to above, damp at 100 feet.

Cement/Bentonite Grout

2-inch PVC Casing

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F-204A Austin (8-95)

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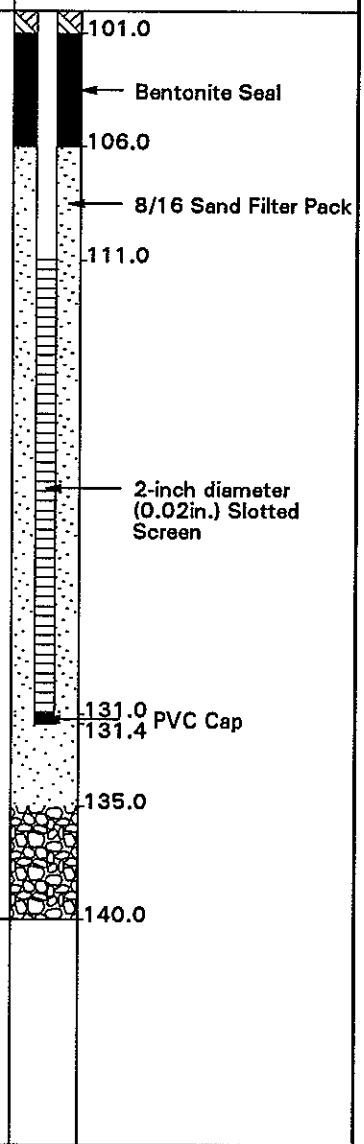
WELL CONSTRUCTION LOG

WELL NO. MW-224

Client: Fina Oil and Chemical Co.	Start Date: 11-17-97	End Date: 11-17-97	Page 3 of 3
Site: Northweast Boundary Investigation, Big Spring	Drilling Method: Air/Wet Rotary		Project Number: 50-01858.26
Geologist: Tracy Payne	Driller: Choate Well Service	Drill Rig Type: Failing 1000	Borehole Diameter: 6.75 Inches
Site Coordinates, UTM in ft.: N: 246794.5100 E: 792342.8700	Total Depth (ft-bgl): 140.00	Surface Elevation(ft)	TOC Elevation(ft): 2521.92 / PAD Elevation(ft): 2519.03
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date: / Time:

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				101–140		Silty Sand(SM) Fine grained sand, subrounded, loose, damp, pinkish tan, 20-30% silt.
		▽		111–140		Silty Sand(SM) Similar to above, moist to saturated at 112 feet.
				121–140		Silty Sand(SM) Similar to above.
				131–140		Silty Sand(SM) Similar to above.
				140		BORING TERMINATED AT 140 FEET BELOW GRADE



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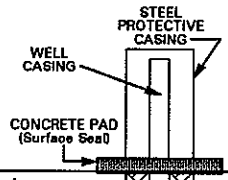
F-204A Austin (8-95)

WELL CONSTRUCTION LOG

WELL NO. MW-224A

Client:		Start Date:	End Date:	Page of
Fina Oil and Chemical Co.		10-29-97	10-29-97	1 4
Site:		**Drilling Method:**		**Project Number:**
Northweast Boundary Investigation, Big Spring		Air/Wet Rotary		50-01858.26
Geologist:	**Driller:**	**Drill Rig Type:**		**Borehole Diameter:**
Tracy Payne	Choate Well Service	Failing 1000		6.75 Inches
Site Coordinates, UTM in ft.:	**Total Depth (ft-bgl):**	**Surface Elevation(ft)**	**TOC Elevation(ft)**	**PAD Elevation(ft)**
N: 246787.8600 E: 792356.7400	160.00		2521.54	2518.68
Datum Description Source:	**Datum Elev. (ft):**	**Water Level Depth Below Grade(ft):**	**Date:**	**Time:**

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				1–49		Sand(SP) Fine to very fine grained, subrounded, poorly graded, loose, dry, dark brown.
						Clayey Sand(SC) 10-20% clay, soft, fine grained sand, subrounded, compact, damp, reddish brown.
						Clayey Sand(SC) Similar to above.
						Silty Sand(SM) Fine grained, subrounded, loose, damp, tan, 20% silt.
						Silty Sand(SM) Similar to above.
						Silty Sand(SM) Similar to above, except reddish tan, 20-30% silt, damp.
						Silty Sand(SM) Similar to above, damp.
						Silty Sand(SM) Similar to above, increase in silt 40-50% with very fine grained sand, damp.



WELL 18586 1/13/98

F-204A Austin (8-95)

Continued Next Page

WELL CONSTRUCTION LOG

WELL NO. MW-224A

Client:		Start Date:	End Date:	Page of
Fina Oil and Chemical Co.		10-29-97	10-29-97	2 4
Site:		Drilling Method:		Project Number:
Northweast Boundary Investigation, Big Spring		Air/Wet Rotary		50-01858.26
Geologist:	Driller:	Drill Rig Type:		Borehole Diameter:
Tracy Payne	Choate Well Service	Failing 1000		6.75 Inches
Site Coordinates, UTM in ft.:	Total Depth (ft-bgl):	Surface Elevation(ft)	TOC Elevation(ft)	PAD Elevation(ft)
N: 246787.8600 E: 792356.7400	160.00		2521.54	2518.68
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				51–99		Silty Sand(SM) Fine grained, subrounded, loose, damp, reddish tan, 20-30% silt.
						Silty Sand(SM) Similar to above, dry, pinkish tan.
						Silty Sand(SM) Similar to above.
						Silty Sand(SM) Similar to above, occasional sandstone seams.
						Silty Sand(SM) Similar to above, damp at 100 feet.

Cement/Bentonite Grout

2-inch PVC Casing

WELL 18586 1/13/98

F-204A Austin (8-95)

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WELL CONSTRUCTION LOG

WELL NO. MW-224A

Client: Fina Oil and Chemical Co.	Start Date: 10-29-97	End Date: 10-29-97	Page 3 of 4
Site: Northwest Boundary Investigation, Big Spring	Drilling Method: Air/Wet Rotary		Project Number: 50-01858.26
Geologist: Tracy Payne	Driller: Choate Well Service	Drill Rig Type: Failing 1000	Borehole Diameter: 6.75 Inches
Site Coordinates, UTM in ft.: N: 246787.8600 E: 792356.7400	Total Depth (ft-bgl): 160.00	Surface Elevation(ft)	TOC Elevation(ft): 2521.54 / PAD Elevation(ft): 2518.68
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date: / Time:

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				101–149		Silty Sand(SM) Fine grained, subrounded, loose, damp, pinkish tan, 20-30% silt.
						Silty Sand(SM) Similar to above, moist at 118 feet.
		▽				Silty Sand(SM) Similar to above, saturated at 120 feet.
						Silty Sand(SM) Similar to above.
						Silty Sand(SM) Similar to above.
						Clay(CL) Low plasticity, soft, saturated, reddish brown, slightly sandy.

Cement/Bentonite Grout

2-inch PVC Casing

143.0

Bentonite Seal

147.5

8/16 Sand Filter Pack

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F-204A Austin (8-95)

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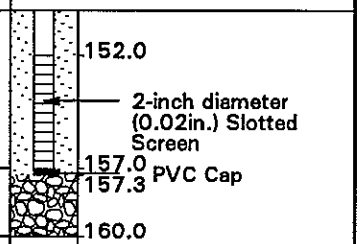
WELL CONSTRUCTION LOG

WELL NO. MW-224A

Client:		Start Date:	End Date:	Page of
Fina Oil and Chemical Co.		10-29-97	10-29-97	4 4
Site:		**Drilling Method:**		**Project Number:**
Northweast Boundary Investigation, Big Spring		Air/Wet Rotary		50-01858.26
Geologist:	**Driller:**	**Drill Rig Type:**		**Borehole Diameter:**
Tracy Payne	Choate Well Service	Failing 1000		6.75 Inches
Site Coordinates, UTM in ft.:	**Total Depth (ft-bgl):**	**Surface Elevation(ft)**	**TOC Elevation(ft)**	**PAD Elevation(ft)**
N: 246787.8600 E: 792356.7400	160.00		2521.54	2518.68
Datum Description Source:	**Datum Elev. (ft):**	**Water Level Depth Below Grade(ft):**	**Date:**	**Time:**

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				151–160		Gravel(GP) Poorly graded, granule to small pebbles, compact, saturated, chert, quartz - subangular to angular.
				157–160		Clay(CH) Moderate to high plasticity, soft, dry, dark reddish brown/gray - Dockum Formation.
				160		BORING TERMINATED AT 160 FEET BELOW GRADE



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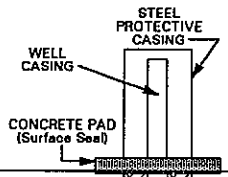
F-204A Austin (8-95)

WELL CONSTRUCTION LOG

WELL NO. MW-225

Client:		Start Date:	End Date:	Page of
Fina Oil and Chemical Co.		11-21-97	11-21-97	1 3
Site:		Drilling Method:		Project Number:
Northwest Boundary Investigation Big Spring		Air/Wet Rotary		50-01858.27
Geologist:	Driller:	Drill Rig Type:		Borehole Diameter:
Tracy Payne	Choate Well Service	Failing 1000		6.75 Inches
Site Coordinates, UTM in ft.:	Total Depth (ft-bgl):	Surface Elevation(ft)	TOC Elevation(ft)	PAD Elevation(ft)
N: 243803.0900 E: 787714.5800	100.00		2476.92	2474.36
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				1–49		Silty Sand(SM) Fine grained, poorly graded, subrounded, compact, damp to dry, brown, 10-20% silt.
						Silty Sand(SM) Similar to above, tan, 30-40% silt, very fine grained sand.
						Silty Sand(SM) Similar to above, light tan, sandstone seam 19-20 feet, moderately to well cemented.
						Silty Sand(SM) Similar to above, dry.
						Silty Sand(SM) 10-20% silt, compact, grades to a light pinkish tan, poorly graded, dry.
						Silty Sand(SM) Similar to above.



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F-204A Austin (8-95)

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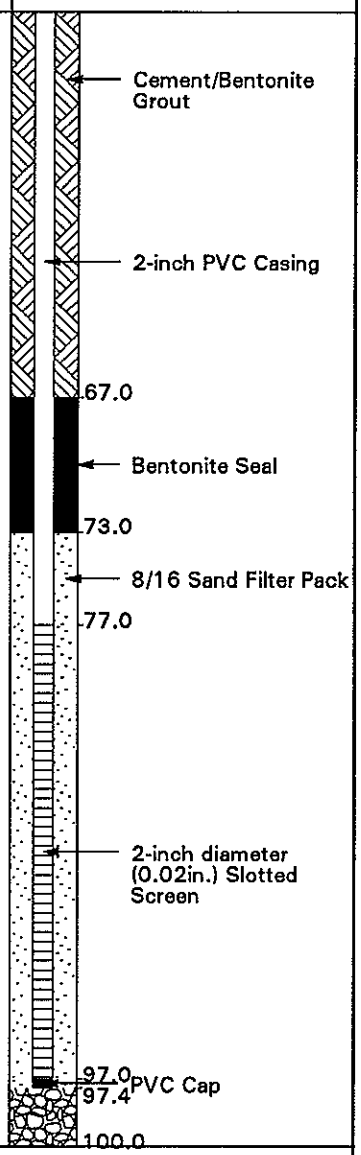
WELL CONSTRUCTION LOG

WELL NO. MW-225

Client: Fina Oil and Chemical Co.		Start Date: 11-21-97	End Date: 11-21-97	Page 2 of 3
Site: Northwest Boundary Investigation Big Spring		Drilling Method: Air/Wet Rotary		Project Number: 50-01858.27
Geologist: Tracy Payne	Driller: Choate Well Service	Drill Rig Type: Failing 1000		Borehole Diameter: 6.75 Inches
Site Coordinates, UTM in ft.: N: 243803.0900 E: 787714.5800	Total Depth (ft-bgl): 100.00	Surface Elevation(ft)	TOC Elevation(ft) 2476.92	PAD Elevation(ft) 2474.36
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				51–99		Silty Sand(SM) 10-20% silt, compact, grades to a light pinkish tan, poorly graded, dry.
						Silty Sand(SM) Similar to above, damp to moist.
						Silty Sand(SM) Similar to above, saturated at 78 feet.
						Silty Sand(SM) Similar to above, saturated.
						Silty Sand(SM) Similar to above, saturated.



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F-204A Austin (8-95)

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WELL CONSTRUCTION LOG

WELL NO. MW-225

Client: Fina Oil and Chemical Co.		Start Date: 11-21-97	End Date: 11-21-97	Page 3 of 3
Site: Northwest Boundary Investigation Big Spring		Drilling Method: Air/Wet Rotary		Project Number: 50-01858.27
Geologist: Tracy Payne	Driller: Choate Well Service	Drill Rig Type: Failing 1000		Borehole Diameter: 6.75 Inches
Site Coordinates, UTM in ft.: N: 243803.0900 E: 787714.5800	Total Depth (ft-bgl): 100.00	Surface Elevation(ft)	TOC Elevation(ft) 2476.92	PAD Elevation(ft) 2474.36
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				101–149		BORING TERMINATED AT 100 FEET BELOW GRADE

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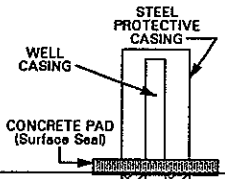
F-204A Austin (8-95)

WELL CONSTRUCTION LOG

WELL NO. MW-225A

Client:		Start Date:	End Date:	Page of
Fina Oil and Chemical Co.		11-21-97	11-21-97	1 3
Site:		Drilling Method:		Project Number:
Northwest Boundary Investigation Big Spring		Air/Wet Rotary		50-01858.27
Geologist:	Driller:	Drill Rig Type:		Borehole Diameter:
Tracy Payne	Choate Well Service	Failing 1000		6.75 Inches
Site Coordinates, UTM in ft.:	Total Depth (ft-bgl):	Surface Elevation(ft)	TOC Elevation(ft)	PAD Elevation(ft)
N: 243815.7700 E: 787711.8900	115.00		2477.25	2474.42
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				1–49		Silty Sand(SM) Fine grained, poorly graded, subrounded, compact, damp to dry, brown, 10-20% silt.
						Silty Sand(SM) Similar to above, tan, 30-40% silt, very fine grained sand.
						Silty Sand(SM) Similar to above, light tan, sandstone seam about 14-20 feet, not well cemented.
						Silty Sand(SM) Similar to above, dry.
						Silty Sand(SM) Compact, 10-20% silt, dry, grades to a light pinkish tan, poorly graded.
						Silty Sand(SM) Similar to above.



Cement/Bentonite Grout

2-inch PVC Casing

WELL 18587 1/13/98

F-204A Austin (8-95)

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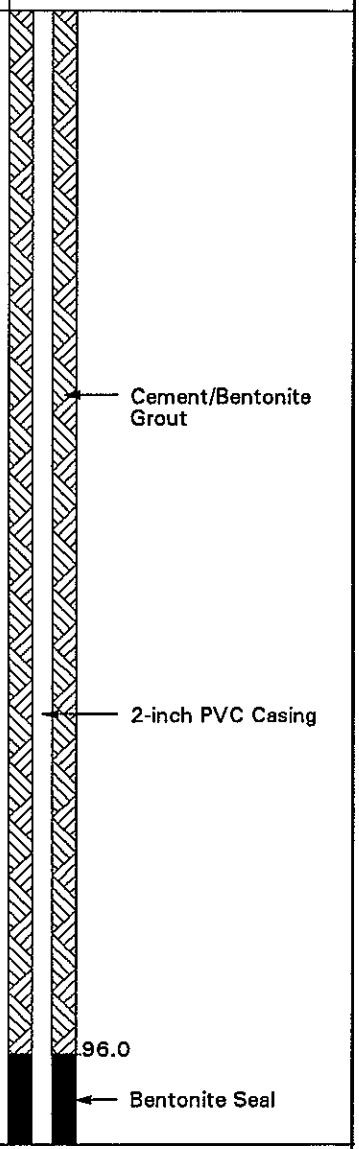
WELL CONSTRUCTION LOG

WELL NO. MW-225A

Client:		Start Date:	End Date:	Page of
Fina Oil and Chemical Co.		11-21-97	11-21-97	2 3
Site:		Drilling Method:		Project Number:
Northwest Boundary Investigation Big Spring		Air/Wet Rotary		50-01858.27
Geologist:	Driller:	Drill Rig Type:		Borehole Diameter:
Tracy Payne	Choate Well Service	Failing 1000		6.75 Inches
Site Coordinates, UTM in ft.:	Total Depth (ft-bgl):	Surface Elevation(ft)	TOC Elevation(ft)	PAD Elevation(ft)
N: 243815.7700 E: 787711.8900	115.00		2477.25	2474.42
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				51–99		Silty Sand(SM) Compact, 10-20% silt, dry, grades to a light pinkish tan, poorly graded.
						Silty Sand(SM) Similar to above, damp to moist.
						Silty Sand(SM) Similar to above, saturated at 78 feet.
						Silty Sand(SM) Similar to above, saturated.
						Silty Sand(SM) Similar to above, saturated.



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F-204A Austin (8-95)

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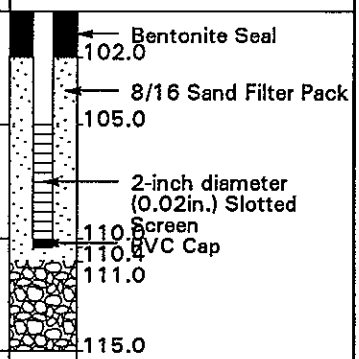
WELL CONSTRUCTION LOG

WELL NO. MW-225A

Client:		Start Date:	End Date:	Page of
Fina Oil and Chemical Co.		11-21-97	11-21-97	3 3
Site:		Drilling Method:		Project Number:
Northwest Boundary Investigation Big Spring		Air/Wet Rotary		50-01858.27
Geologist:	Driller:	Drill Rig Type:		Borehole Diameter:
Tracy Payne	Choate Well Service	Failing 1000		6.75 Inches
Site Coordinates, UTM in ft.:	Total Depth (ft-bgl):	Surface Elevation(ft)	TOC Elevation(ft)	PAD Elevation(ft)
N: 243815.7700 E: 787711.8900	115.00		2477.25	2474.42
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				101–105		Silty Sand(SM) Compact, 10-20% silt, saturated, light pinkish tan, poorly graded.
				105–110		Sandy Gravel(GP) Poorly graded, subrounded, granular to pebble-sized gravel with fine to medium grained sand, compact, chert and quartz, saturated.
				110–115		Clay(CH) Moderate to high plasticity, firm, dry, dark reddish brown, Dockum Formation.
				115		BORING TERMINATED AT 100 FEET BELOW GRADE



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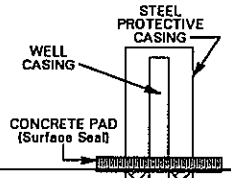
WELL CONSTRUCTION LOG

WELL NO. MW-227

Client:		Start Date:	End Date:	Page of
Fina Oil and Chemical Co.		11-19-97	11-19-97	1 3
Site:		Drilling Method:		Project Number:
Northwest Boundary Investigation, Big Spring		Air/Wet Rotary		50-01858.27
Geologist:	Driller:	Drill Rig Type:		Borehole Diameter:
Tracy Payne	Choate Well Service	Failing 1000		6.75 Inches
Site Coordinates, UTM in ft.:	Total Depth (ft-bgl):	Surface Elevation(ft)	TOC Elevation(ft)	PAD Elevation(ft)
N: 245006.5800 E: 787568.8900	110.00		2486.14	2483.62
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				1–4		Sand(SP) Fine, loose, subrounded, poorly graded, dry, brown.
				5–19		Clayey Sand(SC) Fine, subrounded, poorly graded, compact, 20% clay, dry, reddish brown.
				10–19		Clayey Sand(SC) Similar to above.
				20–29		Silty Sand(SM) Very fine to fine grained, subrounded, poorly graded, loose, dry, tan, 30-40% silt.
				30–34		Silty Sand(SM) Similar to above, except light reddish tan.
				40–49		Silty Sand(SM) Similar to above, except 10-20% silt, damp.



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F-204A Austin (8-95)

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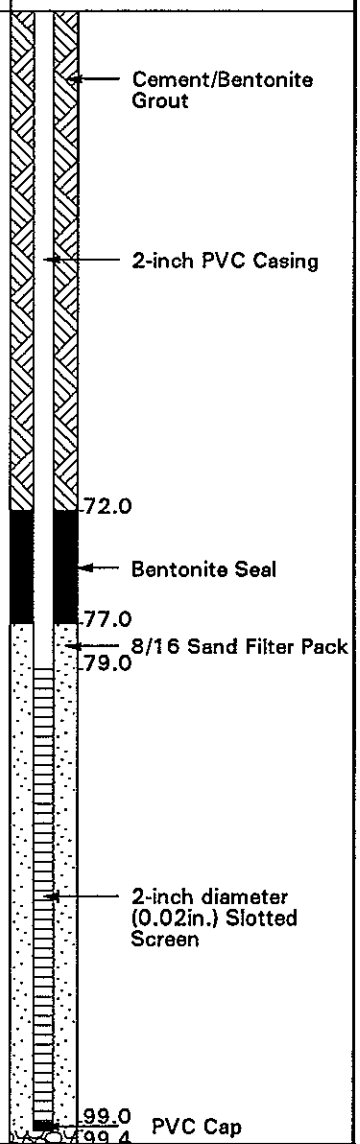
WELL CONSTRUCTION LOG

WELL NO. MW-227

Client:		Start Date:	End Date:	Page of
Fina Oil and Chemical Co.		11-19-97	11-19-97	2 3
Site:		Drilling Method:		Project Number:
Northwest Boundary Investigation, Big Spring		Air/Wet Rotary		50-01858.27
Geologist:	Driller:	Drill Rig Type:		Borehole Diameter:
Tracy Payne	Choate Well Service	Failing 1000		6.75 Inches
Site Coordinates, UTM in ft.:	Total Depth (ft-bgl):	Surface Elevation(ft)	TOC Elevation(ft)	PAD Elevation(ft)
N: 245006.5800 E: 787568.8900	110.00		2486.14	2483.62
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				51–99		Silty Sand(SM) Very fine to fine grained, subrounded, poorly graded, loose, damp, light reddish tan, 10-20% silt.
						Silty Sand(SM) Similar to above, damp.
						Silty Sand(SM) Similar to above.
		▽				Silty Sand(SM) Similar to above, odor, saturated at 80 feet.
						Silty Sand(SM) Similar to above, odor, saturated.



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WELL CONSTRUCTION LOG

WELL NO. MW-227

Client:		Start Date:	End Date:	Page of
Fina Oil and Chemical Co.		11-19-97	11-19-97	3 3
Site:		Drilling Method:		Project Number:
Northwest Boundary Investigation, Big Spring		Air/Wet Rotary		50-01858.27
Geologist:	Driller:	Drill Rig Type:		Borehole Diameter:
Tracy Payne	Choate Well Service	Failing 1000		6.75 Inches
Site Coordinates, UTM in ft.:	Total Depth (ft-bgl):	Surface Elevation(ft)	TOC Elevation(ft)	PAD Elevation(ft)
N: 245006.5800 E: 787568.8900	110.00		2486.14	2483.62
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION	
				101 102 103 104 105 106 107 108 109 110		Silty Sand(SM) Very fine to fine grained, subrounded, poorly graded, loose, saturated, odor, light reddish tan, 10-20% silt.	110.0
				111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149		BORING TERMINATED AT 110 FEET BELOW GRADE	

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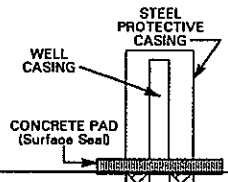
F-204A Austin (8-95)

WELL CONSTRUCTION LOG

WELL NO. MW-227A

Client:		Start Date:	End Date:	Page of
Fina Oil and Chemical Co.		10-27-97	10-27-97	1 3
Site:		Drilling Method:		Project Number:
Northwest Boundary Investigation Big Spring		Air/Wet Rotary		50-01858.27
Geologist:	Driller:	Drill Rig Type:		Borehole Diameter:
Tracy Payne	Choate Well Service	Failing 1000		6.75 Inches
Site Coordinates, UTM in ft.:	Total Depth (ft-bgl):	Surface Elevation(ft)	TOC Elevation(ft)	PAD Elevation(ft)
N: 245019.4300 E: 787559.6600	128.00		2486.81	2484.01
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				1–4		Sand(SP) Fine, loose, subrounded, poorly graded, dry, brown.
				5–19		Clayey Sand(SC) Fine, subrounded, poorly graded, compact, 20% clay, dry, reddish brown. Clayey Sand(SC) Similar to above.
				20–40		Silty Sand(SM) Very fine to fine grained, subrounded, poorly graded, loose, dry, tan, 30-40% silt. Silty Sand(SM) Similar to above, except light reddish tan.
				41–49		Silty Sand(SM) Similar to above, except 10-20% silt, damp.



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F-204A Austin (8-95)

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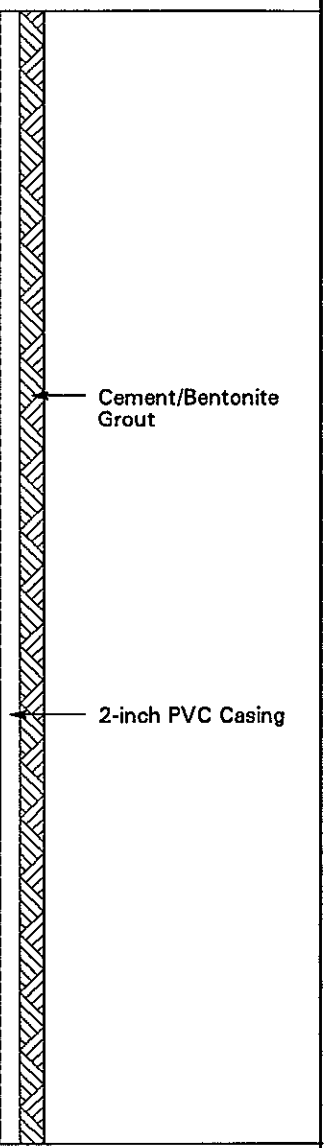
WELL CONSTRUCTION LOG

WELL NO. MW-227A

Client:		Start Date:	End Date:	Page of
Fina Oil and Chemical Co.		10-27-97	10-27-97	2 3
Site:		Drilling Method:		Project Number:
Northwest Boundary Investigation Big Spring		Air/Wet Rotary		50-01858.27
Geologist:	Driller:	Drill Rig Type:		Borehole Diameter:
Tracy Payne	Choate Well Service	Failing 1000		6.75 Inches
Site Coordinates, UTM in ft.:	Total Depth (ft-bgl):	Surface Elevation(ft)	TOC Elevation(ft)	PAD Elevation(ft)
N: 245019.4300 E: 787559.6600	128.00		2486.81	2484.01
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				51–99		Silty Sand(SM) Very fine to fine grained, subrounded, poorly graded, loose, damp, light reddish tan, 10-20% silt.
						Silty Sand(SM) Similar to above, damp.
						Silty Sand(SM) Similar to above.
						Silty Sand(SM) Similar to above, odor, saturation at 83 feet.
						Silty Sand(SM) Similar to above, odor, saturated.



WELL 18587 1/13/98

F-204A Austin (8-95)

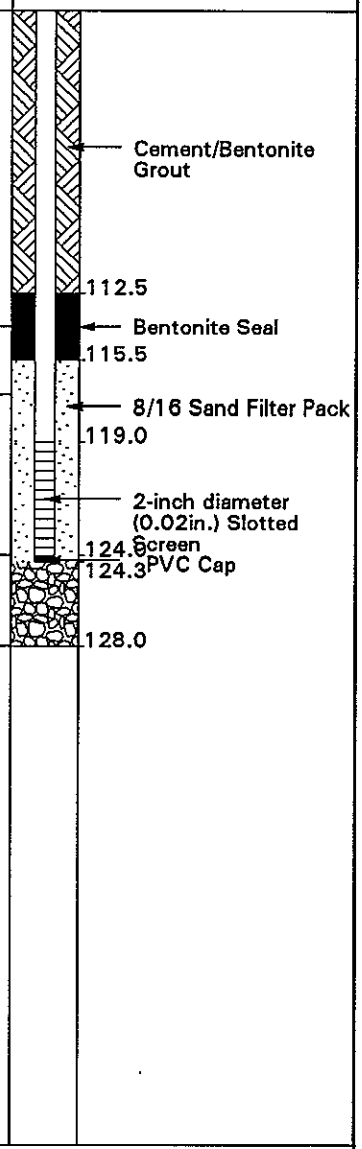
Continued Next Page

WELL CONSTRUCTION LOG

WELL NO. MW-227A

Client: Fina Oil and Chemical Co.		Start Date: 10-27-97	End Date: 10-27-97	Page 3 of 3
Site: Northwest Boundary Investigation Big Spring		Drilling Method: Air/Wet Rotary		Project Number: 50-01858.27
Geologist: Tracy Payne	Driller: Choate Well Service	Drill Rig Type: Failing 1000		Borehole Diameter: 6.75 Inches
Site Coordinates, UTM in ft.: N: 245019.4300 E: 787559.6600	Total Depth (ft-bgl): 128.00	Surface Elevation(ft)	TOC Elevation(ft) 2486.81	PAD Elevation(ft) 2484.01
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				101–114		Silty Sand(SM) Very fine to fine grained, subrounded, poorly graded, loose, saturated, light reddish tan, 10-20% silt.
				111–114		Silty Sand(SM) Similar to above.
				114–117		Clay(CL) Low plasticity, soft, saturated, reddish brown, slightly sandy.
				117–124		Sandy Gravel(GW) 10-20% fine grained sand. Gravel - well graded, granule to pebble, subrounded to subangular, loose, saturated, chert, quartz, shell fragments.
				121–124		Sandy Gravel(GW) Similar to above.
				124–128		Clay(CH) High plasticity, stiff, dry, dark reddish brown, Dockum Formation.
				128		BORING TERMINATED AT 128 FEET BELOW GRADE



WELL 18587 1/13/98

F-204A Austin (8-95)

ATTACHMENT XI.D.3.C(2)B-C
MONITOR WELL CONSTRUCTION/DEVELOPMENT FORMS

FIELD BORING LOG

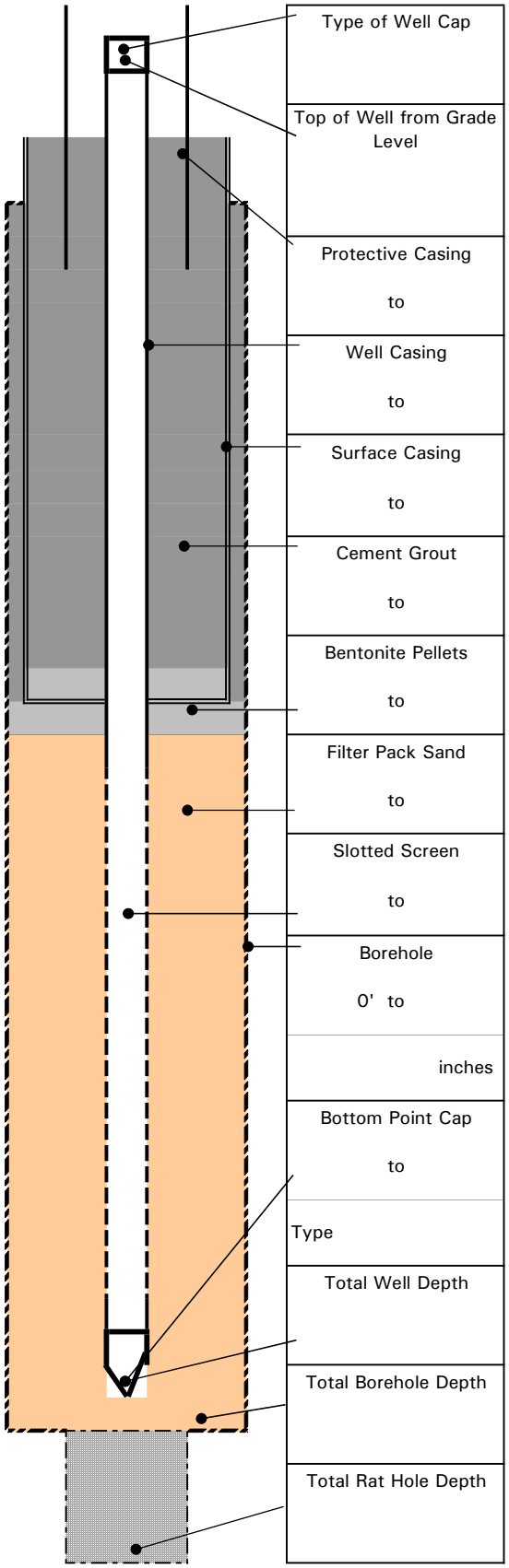
Client:	Job No.	Boring/ Well No.	
Project:	Location	Sheet of	
Groundwater Depth:	Total Depth Drilled	Date Drilled:	
Drilling Method(s)	Drilling Rig Model	Logged By:	
Sampling Methods		Driller & Lic#	
Comments:		Time Start	
		Time Finish	

Inner-Auger Core Barrel					
Interval Cored (feet below grade)	**Length Recov'd**	**OVM Reading**	**Sample No.**	**USCS Symbol**	**Sample Description**
to					

FIELD WELL COMPLETION DATA FORM

Client:	Job No.
Project:	Location
Project Manager	Date Installed:
Geologist:	License No.
Top Saturation:	Type Rig: [ ] Hollow St [ ] GeoProbe [ ] Rotary --- ( )Air ( )Water
Drilling Method(s)	Total Depth Drilled
Drilling Company:	Drilling Rig Model
Driller	License No.

Well Name:



DEVELOPMENT

Method Used:	[ ]Over-Pump [ ]Bail	[ ]Air Jet [ ]Water Jet	[ ]Other (describe):	
Began:	Date & Time:	Finish:	Date & Time:	
PRE	pH	Turbidity	Specific Conductance	Temp.
POST	pH	Turbidity	Specific Conductance	Temp.
Volume Removed		Rate of Removal		
Water Disposal To:		**Use Well Development Form For Detailed Record**		

MATERIALS USED

Filter Pack Sand	# Sacks	Sieve Size	Manufacturer
Bentonite Pellets	# Pails	Pellet Size	Manufacturer
Cement - Bentonite Grout	# Sacks Cement	Grade Type	Manufacturer
	Grout Weight (lbs / gallon)		
	# Sacks Bentonite	Grade Type	Manufacturer
Blank Casing	# Feet	Diameter	Manufacturer
Slotted Screen	# Feet	Diameter	Slot Size
Surface Casing	# Feet	Diameter	Type [ ] PVC [ ] Stainless [ ] Black Steel
Surface Protection	[ ]Flush [ ]Stand	Dia. Of Pipe	Locking? [ ] YES [ ] NO
Other	Surface Pad Size:	Depth to Centralizers:	

WELL DEVELOPMENT RECORD

Alon USA Big Spring Refinery	Well Numbeer

Date: _____

(A) Static Water Level: _____ feet below Top of Casing (BTOC)

(B) Original Borehole Depth: _____ feet BTOC

(C) Water Column (h): _____ feet…..[(B) - (A)]

(D) Borehole Diameter (d): _____ inches

_____ feet…..[(D) / 12]

(E) Borehyole Radius (r): _____ inches

_____ feet…..[(E) / 12]

(F) Purge Vollume (V)[(1)] _____ gallons….[(C) x 3.264)]

(G) Production Rate (Q): _____ gallons per minute

(H) Final Water Level: _____ feet BTOC

(1): Formula for calculating Purge Volume (12-inch borehole with 8-inch well) =

$V_{gallons} = ((B)_{feet} - (A)_{feet}) \times 3.264$ gallons per linear fppt

Gallons Purged	Time	Water Level (ft-BTOC)	Temperature (°C)	pH (stnd units)	Specific Conductance µmhos/cm)	Visual Water Quality

Temperture Units:	**Specific Conductance Units:**
Time Started:	**Name of Technician:**
Time Completed:	**Name of Geologist:**

Drilling Method Used:

- ☐ **Air Rotary**
- ☐ **Potable Water Only**
- ☐ **Other:** _____
- ☐ **Mud Additives**
- ☐ **Auger Only**

Supplemental Table XI.D. - SECTION IX – COMPLAINCE PLAN SUPPLEMENTAL INFORMATION:

SECTION	DESCRIPTION	RESPONSE
D.	Corrective Action Program	
D.1.	Type of Corrective Action	b. Groundwater well recovery/surface treatment/reinjection
D.2.a.	Program Description	See Attachment XI.D.3.c.(2)(a) - Recovery System Design
D.2.b.	Vapor Extraction System	Not Applicable - No Vapor Extraction System
D.2.c.	Interceptor Tranches	Not Applicable- No Interceptor Tranches
D.2.d.	In-Situ Treatment - Chemical Reaction	Not Applicable - No In-Situ Treatment - Chemical Reaction
D.2.e.	In-Situ Treatment Bioreclamation	Not Applicable - In-Situ Treatment Bioreclamation
D.2.f.	Barrier Walls	Not Applicable - Barrier Walls
D.2.g.	Permeble Treatment Beds	Not Applicable - Permeble Treatment Beds
D.2.h.	Other	Not Applicable - Other
D.3.a.	Groundwater Monitoring and Corrective Action Program Description	
D.3.a.(1)	Changes from Current Progam	
D.3.a.(1)(a)	Geological and/or hydrogeological Information	SITE E & BICA - No changes from the 2014 Compliance Plan
D.3.a.(1)(b)	Waste Management Units	SITE E & BICA - No changes from the 2014 Compliance Plan
D.3.a.(1)(c)	Construction Details	SITE E & BICA - No changes from the 2014 Compliance Plan
D.3.a.(1)(d)	Number and location of additional monitoring wells	SITE E & BICA - No changes from the 2014 Compliance Plan
D.3.a.(1)€	Sample handling, COC, analysis	SITE E & BICA - No changes from the 2014 Compliance Plan
D.3.a.(1)(f)	Frequency of monitoring	SITE E & BICA - No changes from the 2014 Compliance Plan
D.3.a.(1)(g)	Monitoring Parameters	SITE E & BICA - No changes from the 2014 Compliance Plan
D.3.a.(1)(h)	Evaluation of Compliance	SITE E & BICA - No changes from the 2014 Compliance Plan
D.3.a.(1)(i)	Other SAP Information	Not Applicable
D.3.a.(1)(j)	Compliance Period	SITE E & BICA - No changes from the 2014 Compliance Plan
D.3.a.(1)(k)	Financil Assurance	See Table XI.E.3. - Financial Assurance Summary
D.3.a.(1)(l)	ACL Variance	Not Applicable
D.3.a.(2)	Monitoring System	See Attachment XI.D.3.c(2)b - Monitor System Plan
		See CP Table V - Designation of Wells [BICA} & Designation of Wells [SITE E]
D.3.a(3)	Hazardous Constituents	See CP Table III - Corrective Action Program Table of Detected Hazardous and Solid Waste Constituents and the Groundwater Protection Standard
D.3.a(4)	Indicator Parameters	See CP Table IIIA - Corrective Action Program Table of Indicator Parameters and the Groundwater Protection Standard

Supplemental Table XI.D. - SECTION IX – COMPLAINCE PLAN SUPPLEMENTAL INFORMATION:

SECTION	DESCRIPTION	RESPONSE
D.3.a(5)	Monitoring Frequency	See CP Table VIII - Compliance Schedule. No changes from the 2014 Compliance Program - Corrective Action Monitoring will occur semiannually during the first and third quarters of each calendar year (January and July)
D.3.a(6)	Semiannual Reporting	See Table CP VII - Reporting Requirments. Groundwater data shall be reported semiannually with the first semiannual event (January to March) reported on or before July 21 of each calendar year and the second semiannual sampling event (July to September) reported on or before January 21 of each calendar year.
D.3.a(7)	Contaminate plume rate and direction of migration	The rate and direction of migration will be determined based on the results of the second semiannual sampling event (July to September) analytical and fluid level measurements and will be reported in the next report due on or before January 21 of each calendar year.
D.3.a(8)	Compliance Period	See CP Table VI - Compliance Period. BICA Compliance Period - 10 years, Site E Compliance Period - 10 Years
D.3.b.	Method of evaluating the effectiveness of the corrective action	The method of evaluating the effectiveness of the corrective action activities is a statistical evaluation utilizing the Mann-Kendall Statistical Calculations - See Attachment CP C [XI.D.3.c(1)] - Sample and Analysis Plan, Section 8 - Evaluation of analysitcal results.
D.3.c.(1)	Sample and Analysis Plan	See Attachment CP C [XI.D.3.c(1)] - Sample and Analysis Plan
D.3.c.(2)(a)	Recovery System Plan	See Attachment XI.D.3.c.(2)a - Recovery System Plan
D.3.c.(2)(b)	Monitoring System Plan	See Attachment XI.D.3.c.(2)b - Monitoring System Plan
D.3.c.(3)	Current Geologic and Hydrogeologic Report	See Attachment VI - Geology Report
D.4.	Waste Management Units/Areas Monitoried Under Corrective Action Progarm	
D.4.a.	Delineation and ID of each waste management unit/area in corrective action system	
D.4.a(1)	System Boundaries	

Alon Big Spring Refinery – Big Spring, TX (Owned by Delek US)

Hazardous Waste Permit 50140 - Part B Application
SWR No. 30083 / RN100250869 / CN600125124

SUBSECTION XI.E.

COST ESTIMATES FOR FINANCIAL ASSURANCE

May 29, 2025

Table XI.E.1.	Corrective Action Program Cost Estimate
Table XI.E.2.e. [BICA Monitoring]	Groundwater Monitoring Cost Estimate
Table XI.E.2.e. [Site E Monitoring]	Groundwater Monitoring Cost Estimate
Table XI.E.3.	Financial Assurance Summary
Calculation Worksheets (including references to value sources)	

Table XI.E.1. Corrective Action Program Cost Estimate		
1. Pumping Capacity Per Year:		
A. Daily average system pumping rate	5,739	gal/day
B. Annual groundwater volume recovered	2,094,775	gal/yr
2. Off-Site Liquid Treatment / Disposal Cost:		
A. Volume of treated contaminated water to be disposed of off-site yearly	0	gal/yr
B. Transportation of liquid waste disposed of off-site yearly		
(1) Transportation cost per gallon	$0.00	$/gal
(2) Gallons of contaminated water shipped per year	0	gal/yr
(3) Annual cost of transportation (1 x 2)	0	$/yr
C. On-site yearly storage cost prior to off-site disposal	0	$/yr
D. Off-site yearly treatment cost of liquid waste		
(1) Treatment charge per gallon	0	$/gal
(2) Total volume to be treated per year	0	gal/yr
(3) Annual treatment cost (1 x 2)	0	$/yr
E. Off-site disposal cost of liquid waste per year		
(1) Disposal charge per gallon	$0.00	$/gal
(2) Total volume to be disposed per year	0	gal/yr
(3) Annual disposal cost (1 x 2)	0	$/yr
***Annual Off-Site Liquid Treatment / Disposal Cost(2B3 + 2C +2D3 + 2E3)**	$0.00	$
3. On-site Waste Water Treatment System Cost and On-site Treatment / Disposal Cost: Submit a cost estimate for a treatment system specifically designed and used exclusively for the groundwater corrective action program and operational after some start up maintenance. Estimates to clean out the system should also be included in the following cost.		
A. Initial capital expenditure for treatment system including start up maintenance	$0.00	
***On-Site Waste Water Treatment System Capital Cost (3A)**	$0.00	
B. Gallons of contaminated water to be treated on-site per year	2,094,775	gal/yr
C. Cost of on-site treatment per gallon	$0.01	$/gal

D. Cost of sludge, or solids disposal per year	$2,500.00	$/yr
E. Cost per year of maintenance on treatment system and recovery	$2,500.00	$/yr
F. Cost of on-site disposal per year	$0.00	$/yr
***Annual On-Site Treatment / Disposal Cost [(3B x 3C) + 3D + 3E + 3F]**	**$30,137.30**	
4. Inspections, Maintenance and Operation Cost for the Corrective Action Program:		hour/yr
A. Operator's time on-site for inspections and maintenance per year	2,000	$/hr
B. Charge of salary per hour	50	$/yr
C. Annual cost of labor (4A x 4B)	100,000	$/yr
D. Replacement of parts and equipment per year	400	$/yr
E. Electricity cost per year	11,000	$/yr
***Annual Inspections / Maintenance / Operation Cost for the Corrective Action Program (4C + 4D + 4E)**	$111,400.00	

Table XI.E.2.e - Groundwater Monitoring Cost Estimate		
1. Annual Sampling and Analysis Cost:	BICA Monitoring	
A. Background Wells		
(1) Number of wells	4	
(2) Sample analysis cost per well	$119.00	$/well
(3) Number of sampling events per year	2	/yr
(4) Sampling cost (1 x 2 x 3)	$952.00	
B. Point of Compliance Wells		
(1) Number of wells	38	
2) Sample analysis cost per well	$119.00	$/well
(3) Number of sampling events per year	2	/yr
(4) Sampling cost (1 x 2 x 3)	$9,044.00	
C. Recovery Wells		
(1) Number of wells	11	
(2) Sample analysis cost per well	$44.00	$/well
(3) Number of sampling events per year	2	/yr
(4) Sampling cost (1 x 2 x 3)	968	
D. Corrective Action Observation Wells		
(1) Number of wells	0	
(2) Sample analysis cost per well	$0.00	$/well
(3) Number of sampling events per year	0	/yr
(4) Sampling cost (1 x 2 x 3)	$0.00	
E. Point of Exposure Wells		
(1) Number of wells	0	
(2) Sample analysis cost per well	$0.00	$/well
(3) Number of sampling events per year	0	/yr
(4) Sampling cost (1 x 2 x 3)	$0.00	
F. Supplemental Wells		
(1) Number of wells	0	
(2) Sample analysis cost per well	$0.00	$/well

Table XI.E.2.e - Groundwater Monitoring Cost Estimate		
(3) Number of sampling events per year	0	/yr
(4) Sampling cost (1 x 2 x 3)	$0.00	
G. Field Quality Control Sampling		
(1) Number of wells	5	
(2) Sample analysis cost per well	$119.00	$/well
(3) Number of sampling events per year	2	/yr
(4) Sampling cost (1 x 2 x 3)	$1,190.00	
H. Sampling Analysis Cost (1.A+1.B+1.C+1.D+1.E+1.G)	$12,154.00	
2. Sampling Labor Cost:		
A. Hours of sampling per well	1	hrs/well
B. Number of sampling technicians per well	1	/yr
C. Charge per hour	$90.00	$/hr
D. Total number of wells to be sampled annually	0	
E. Total number of wells sampled semi-annually	64	
F. Total number of wells sampled quarterly	0	
G. Total number of wells sampled monthly	0	
H. Total number of wells sampled per year (2D) + (2E x 2) + (2F x 4) + (2G x 12)	128	
I. Sampling Labor Cost (2A x 2B x 2C x 2H)	$11,520.00	
***Annual Groundwater Monitoring Cost**	$23,674.00	
3. Well Installation (typical cost):		
A. Monitor well installation cost per well	$6,000.00	$/well
B. Number of monitor wells to be installed	0	
C. Cost of monitor well system (A x B)	$0.00	
D. Recovery well installation cost per well	$8,500.00	$/well
E. Number of Recovery Wells to be installed	0	
F. Cost of Recovery well system (D x E)	$0.00	
***Total Well Installation Cost (3C + 3F)**	0	
4. Administrative Cost:		

Table XI.E.2.e - Groundwater Monitoring Cost Estimate		
A. Annual cost for record-keeping and report preparation	$10,000.00	
***Annual Administrative Cost (4A)**	$10,000.00	$
5. Inspection and Maintenance Cost for the Monitoring Program:		
A. Operator's time (hours) on-site for inspections and maintenance per year	$500.00	$/hr
B. Charge or salary per hour	$80.00	$/hr
C. Annual cost of labor (4A x 4B)	$40,000.00	$/hr
D. Replacement of parts and equipment per year	$250.00	$/hr
***Annual Inspections / Maintenance Cost for the Groundwater Monitoring Program (5C + 5D)**	$40,250.00	

Table XI.E.2.e - Groundwater Monitoring Cost Estimate		
1. Annual Sampling and Analysis Cost:	SITE E Monitoring	
A. Background Wells		
(1) Number of wells	2	
(2) Sample analysis cost per well	$272.00	$/well
(3) Number of sampling events per year	2	/yr
(4) Sampling cost (1 x 2 x 3)	$1,088.00	
B. Point of Compliance Wells		
(1) Number of wells	6	
2) Sample analysis cost per well	$272.00	$/well
(3) Number of sampling events per year	2	/yr
(4) Sampling cost (1 x 2 x 3)	$3,264.00	
C. Recovery Wells		
(1) Number of wells	0	
(2) Sample analysis cost per well	$0.00	$/well
(3) Number of sampling events per year	0	/yr
(4) Sampling cost (1 x 2 x 3)	0	
D. Corrective Action Observation Wells		
(1) Number of wells	0	
(2) Sample analysis cost per well	$0.00	$/well
(3) Number of sampling events per year	0	/yr
(4) Sampling cost (1 x 2 x 3)	$0.00	
E. Point of Exposure Wells		
(1) Number of wells	0	
(2) Sample analysis cost per well	$0.00	$/well
(3) Number of sampling events per year	0	/yr
(4) Sampling cost (1 x 2 x 3)	$0.00	
F. Supplemental Wells		
(1) Number of wells	0	
(2) Sample analysis cost per well	$0.00	$/well

Table XI.E.2.e - Groundwater Monitoring Cost Estimate		
(3) Number of sampling events per year	0	/yr
(4) Sampling cost (1 x 2 x 3)	$0.00	
G. Field Quality Control Sampling		
(1) Number of wells	1	
(2) Sample analysis cost per well	$272.00	$/well
(3) Number of sampling events per year	2	/yr
(4) Sampling cost (1 x 2 x 3)	$544.00	
H. Sampling Analysis Cost (1.A+1.B+1.C+1.D+1.E+1.G)	$4,896.00	
2. Sampling Labor Cost:		
A. Hours of sampling per well	1	hrs/well
B. Number of sampling technicians per well	1	/yr
C. Charge per hour	$90.00	$/hr
D. Total number of wells to be sampled annually	0	
E. Total number of wells sampled semi-annually	8	
F. Total number of wells sampled quarterly	0	
G. Total number of wells sampled monthly	0	
H. Total number of wells sampled per year (2D) + (2E x 2) + (2F x 4) + (2G x 12)	16	
I. Sampling Labor Cost (2A x 2B x 2C x 2H)	$1,440.00	
***Annual Groundwater Monitoring Cost**	$6,336.00	
3. Well Installation (typical cost):		
A. Monitor well installation cost per well	$6,000.00	$/well
B. Number of monitor wells to be installed	0	
C. Cost of monitor well system (A x B)	$0.00	
D. Recovery well installation cost per well	$8,000.00	$/well
E. Number of Recovery Wells to be installed	0	
F. Cost of Recovery well system (D x E)	$0.00	
***Total Well Installation Cost (3C + 3F)**	0	
4. Administrative Cost:		

Table XI.E.2.e - Groundwater Monitoring Cost Estimate		
A. Annual cost for record-keeping and report preparation	$4,000.00	
***Annual Administrative Cost (4A)**	$4,000.00	$
5. Inspection and Maintenance Cost for the Monitoring Program:		
A. Operator's time (hours) on-site for inspections and maintenance per year	$20.00	$/hr
B. Charge or salary per hour	$80.00	$/hr
C. Annual cost of labor (4A x 4B)	$1,600.00	$/hr
D. Replacement of parts and equipment per year	$250.00	$/hr
***Annual Inspections / Maintenance Cost for the Groundwater Monitoring Program (5C + 5D)**	$1,850.00	

Table XI.E.3. - Financial Assurance Summary

Task	Cost
Annual Off-Site Liquid Treatment / Disposal Cost	$0.00
Annual On-Site Treatment / Disposal Cost	$30,137.00
Annual Inspection / Maintenance / Operation Cost For The Corrective Action Program	111,400
Annual Groundwater Monitoring Cost	$30,010.00
Annual Administrative Cost	$14,000.00
Annual Inspection And Maintenance Cost For The Groundwater Monitoring Program	$42,100.00
Annual Sub Total	**$227,647**
Total Years Used For Calculating Financial Assurance for Corrective Action and/or Compliance Monitoring Program	**19** Years
Remediation Cost (Annual Sub Total x Total Years Used)	$4,325,299
On-Site Waste Water Treatment System Capital Cost Total Well Cost	$0.00
10% Contingency	$432,530
Total Cost	$4,757,829
Grand Total Cost (round to nearest $1000)	**$4,758,000**

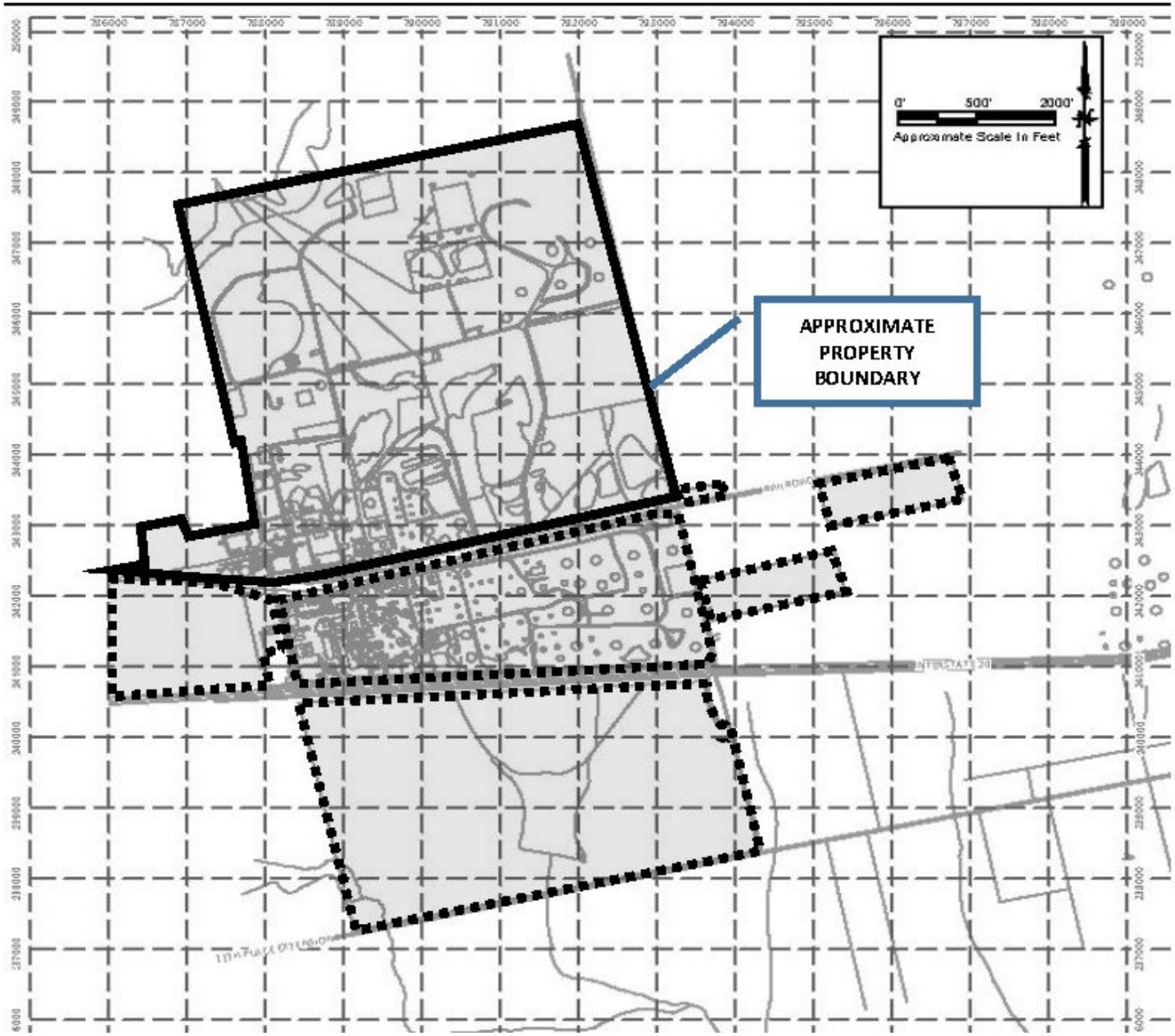
Alon USA, LP
Alon USA Big Spring Refinery

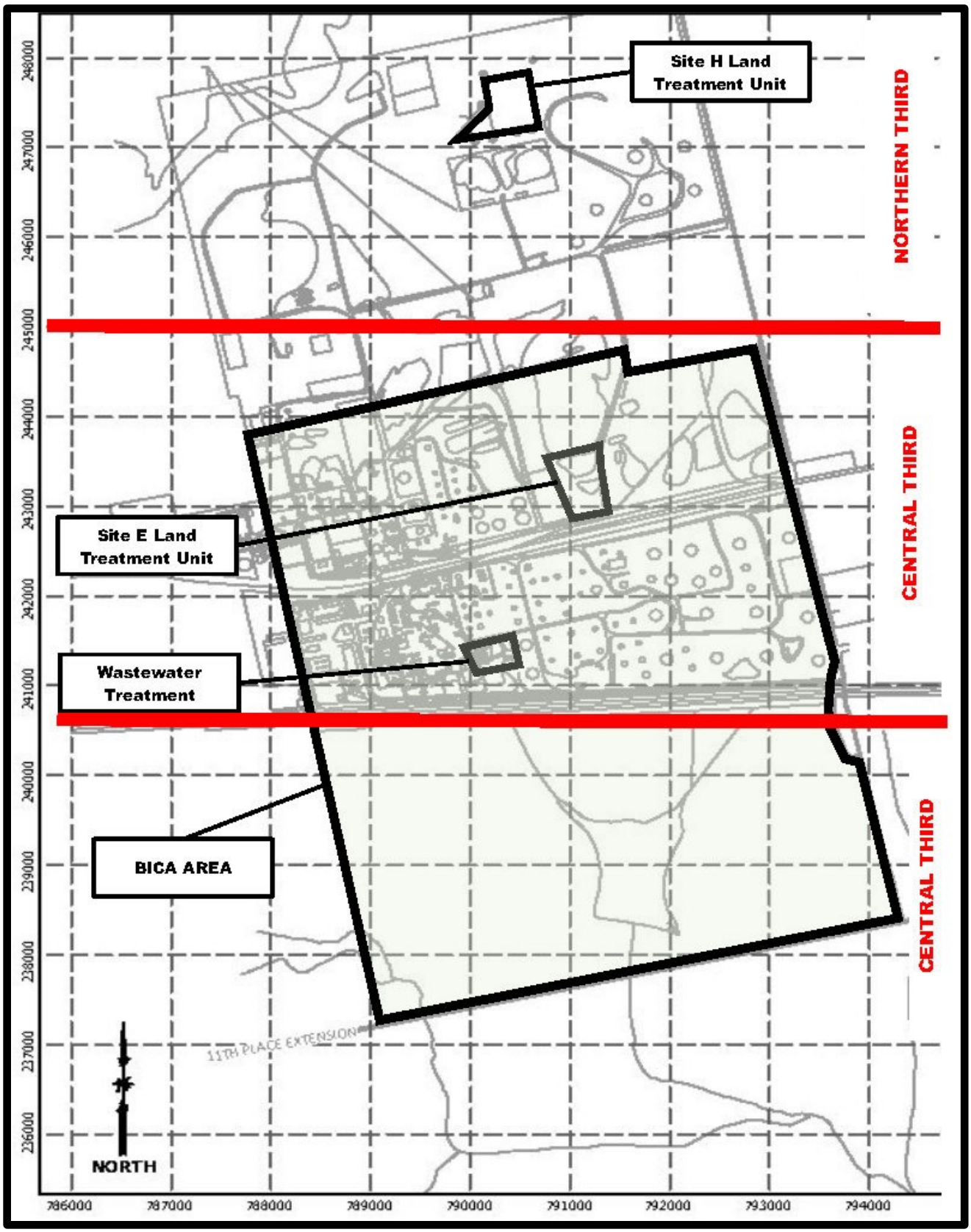
Big Spring, Texas
Howard County

Hazardous Waste Permit 50140
Part B Application
SWR No. 30083
RN100250869 / CN600881783

APPENDIX XI ATTACHMENT A
COMPLIANCE PLAN MAPS

CP Attachment A, Sheet 1 of 12 Facility Boundary Map




Site H Land Treatment Unit
NORTHERN THIRD
CENTRAL THIRD
Site E Land Treatment Unit
Wastewater Treatment
BICA AREA
CENTRAL THIRD
11TH PLACE EXTENSION
NORTH
248000
247000
246000
245000
244000
243000
242000
241000
240000
239000
238000
237000
236000
786000
787000
788000
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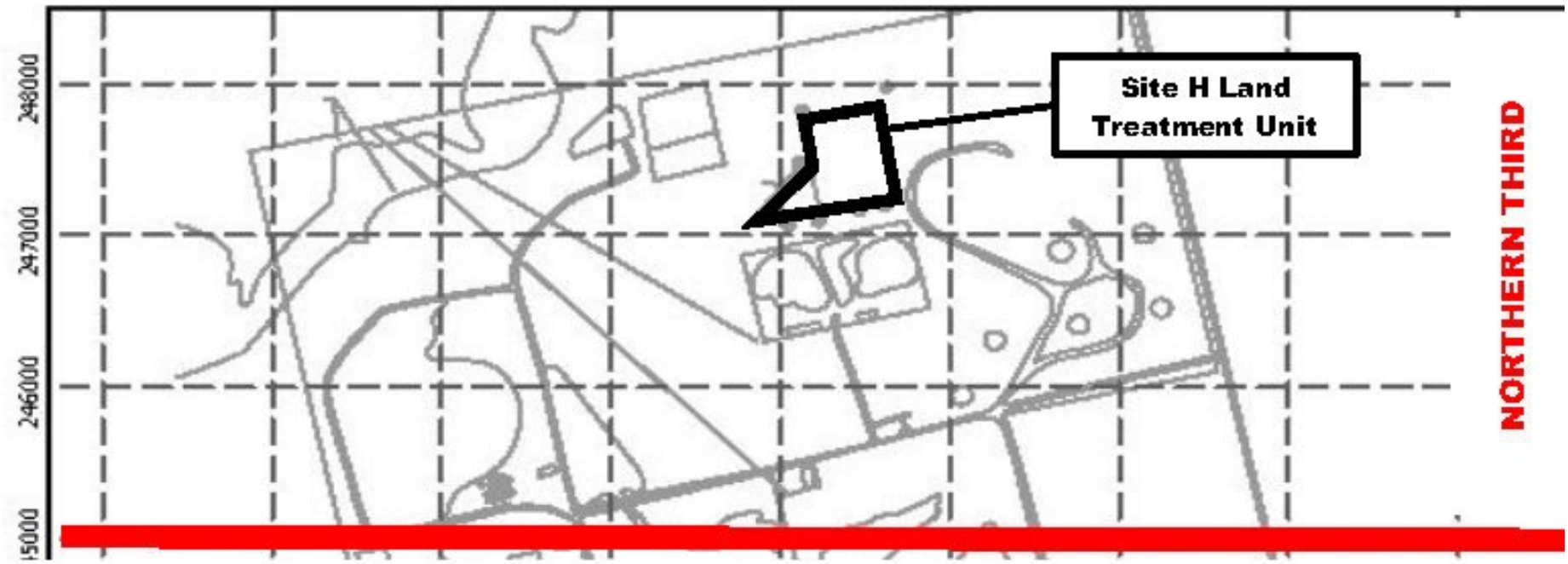
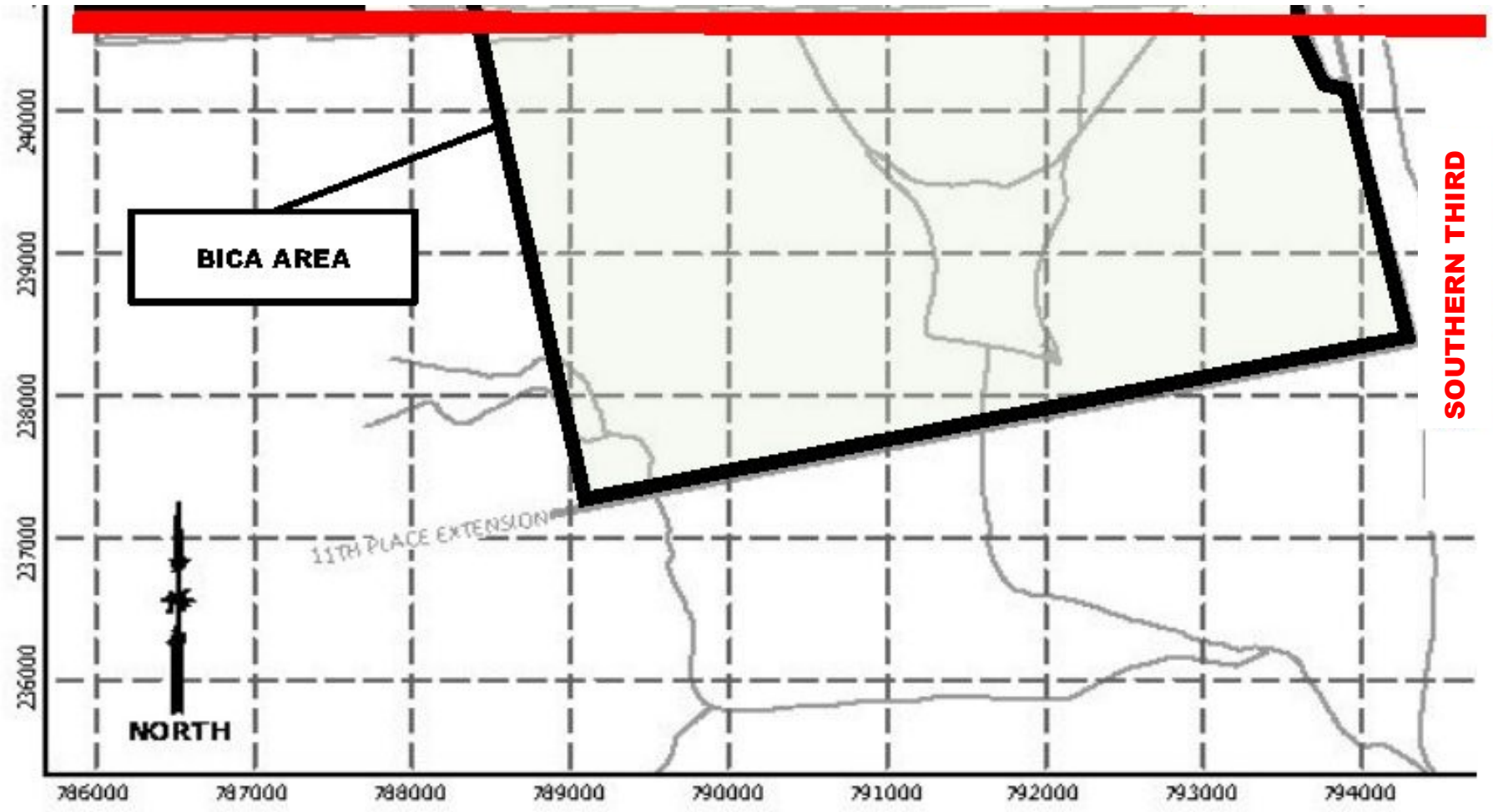
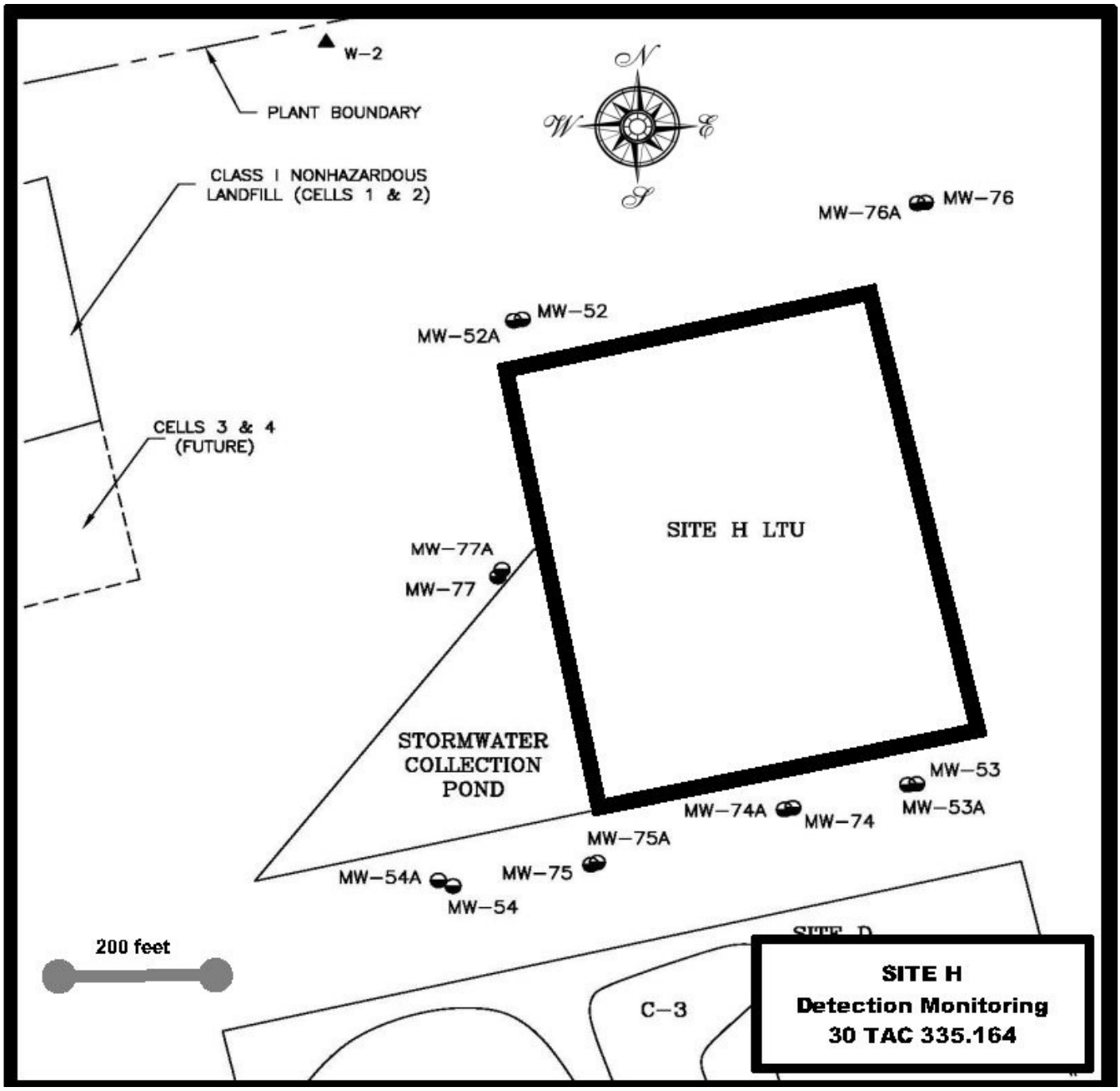
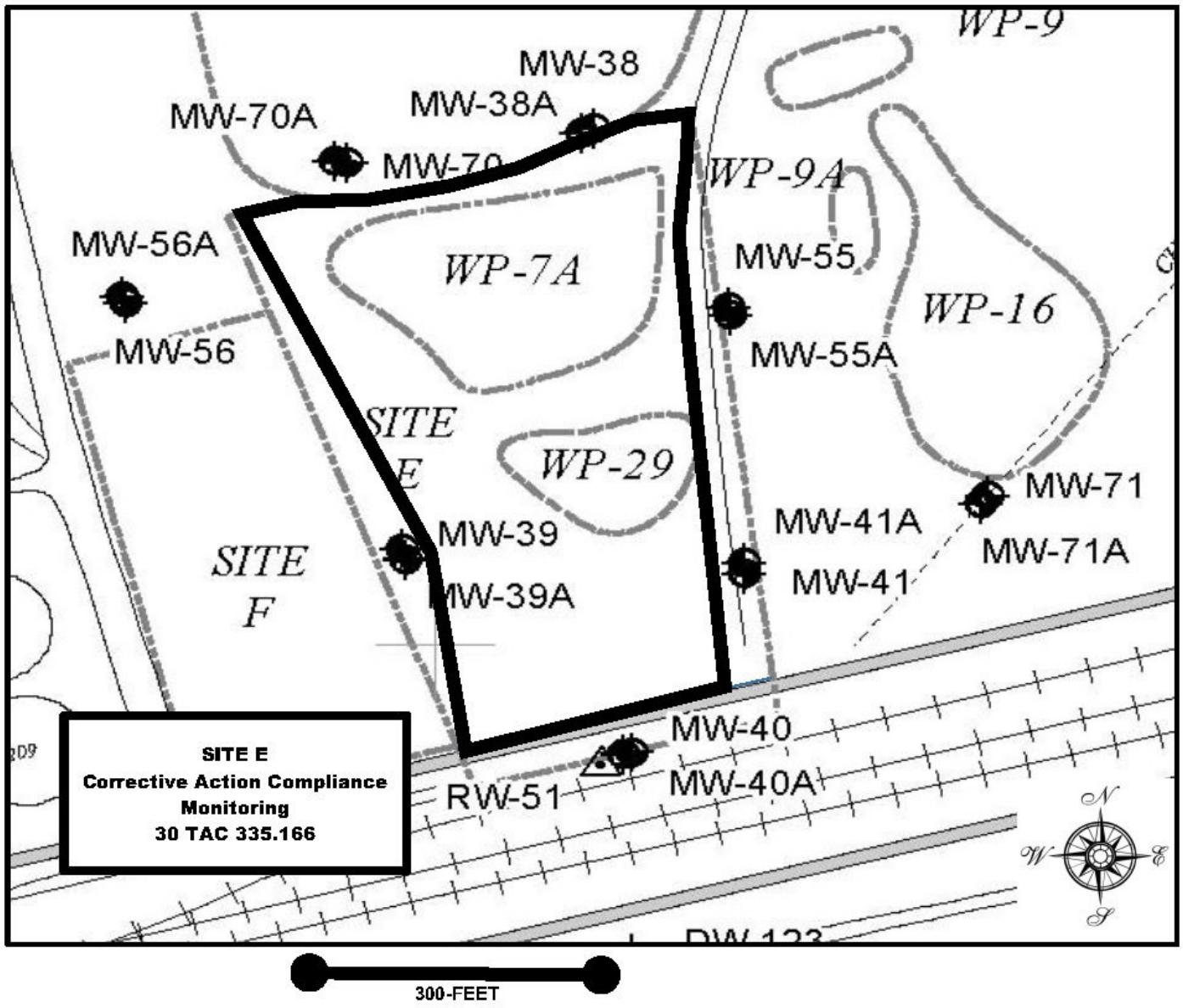
791000
792000
793000
794000

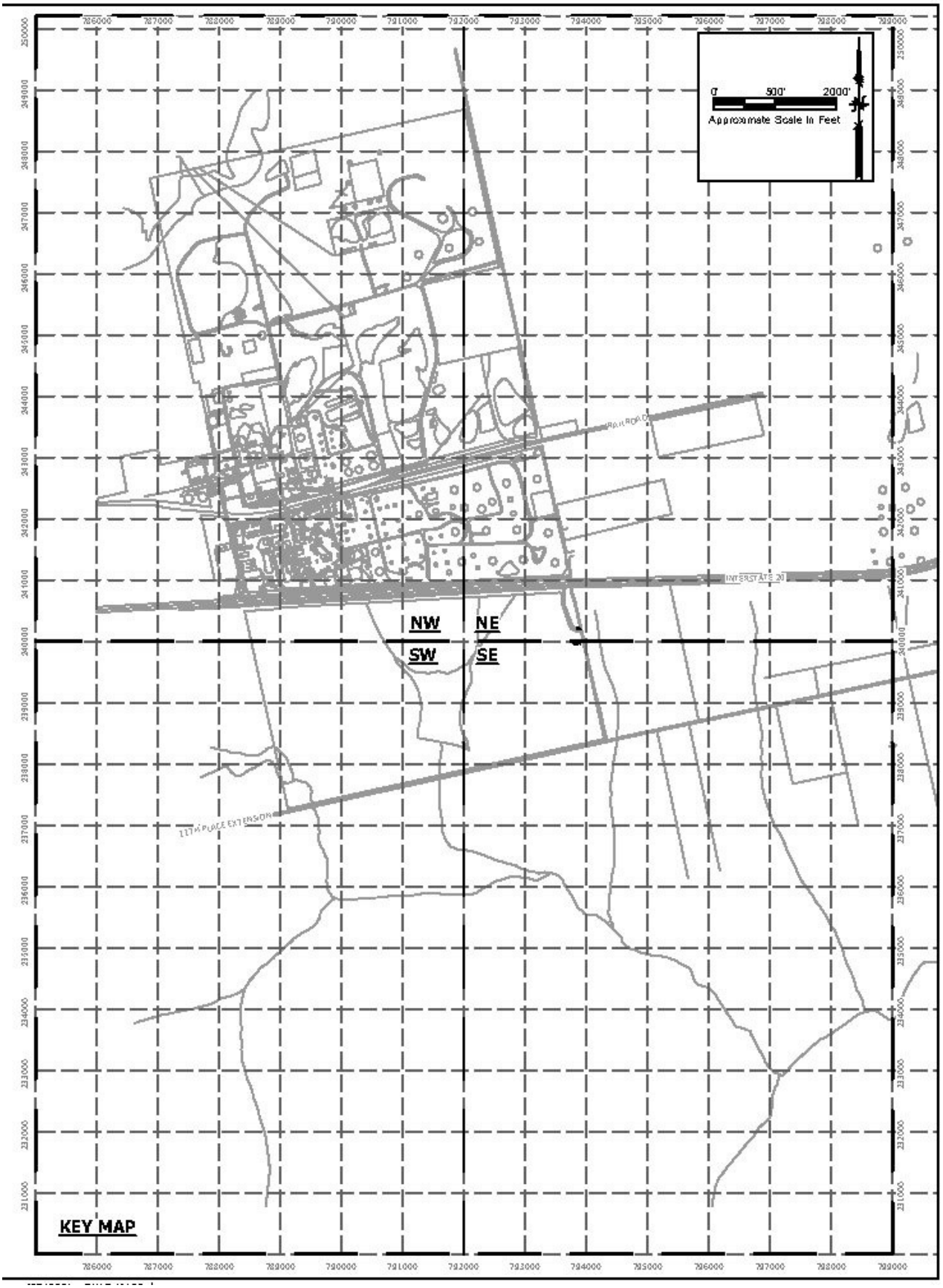

Site H Land
Treatment Unit
NORTHERN THIRD
248000
247000
246000
15000

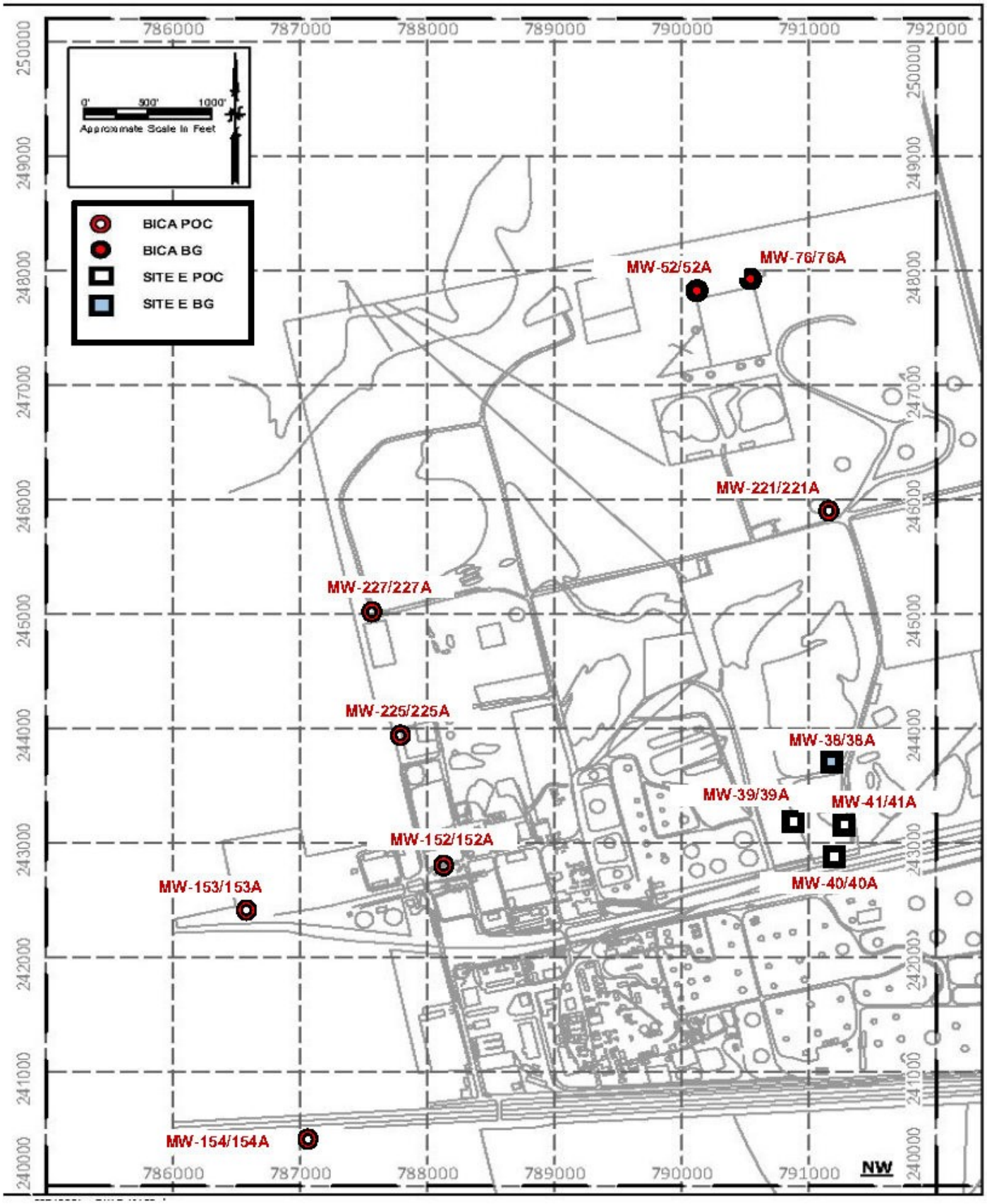
24500
244000
243000
242000
241000
Site E Land Treatment Unit
Wastewater Treatment
CENTRAL THIRD


BICA AREA
SOUTHERN THIRD
11TH PLACE EXTENSION
NORTH
240000
239000
238000
237000
236000
786000
787000
788000
789000
790000
791000
792000
793000
794000

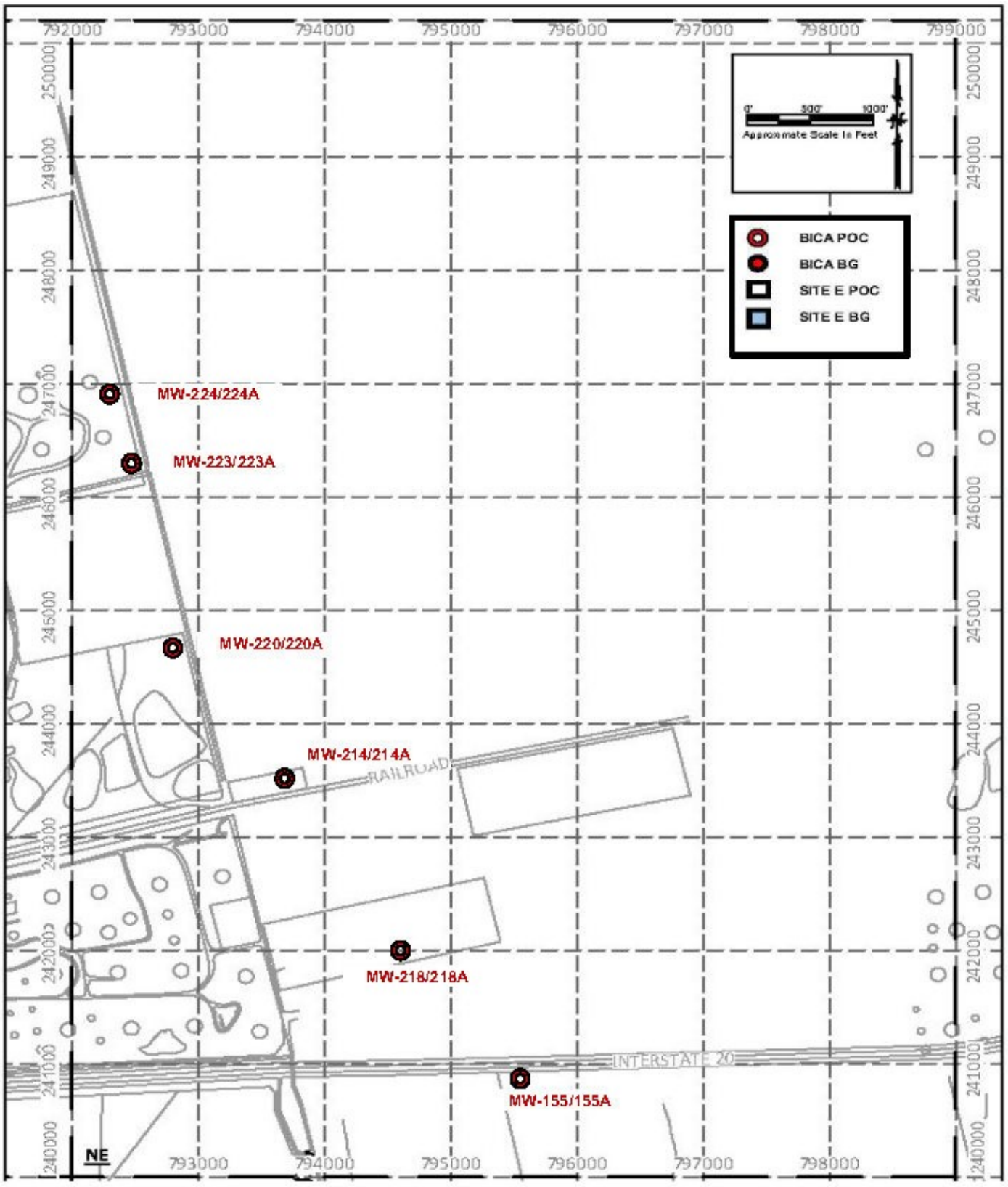

W–2
PLANT BOUNDARY
N
W
E
S
CLASS I NONHAZARDOUS LANDFILL (CELLS 1 & 2)
MW–76A
MW–76
MW–52
MW–52A
CELLS 3 & 4 (FUTURE)
SITE H LTU
MW–77A
MW–77
STORMWATER COLLECTION POND
MW–53
MW–53A
MW–74A
MW–74
MW–75A
MW–54A
MW–75
MW–54
200 feet
C–3
SITE H
Detection Monitoring
30 TAC 335.164


WP-9
MW-38
MW-38A
MW-70A
MW-70
WP-9A
MW-56A
WP-7A
MW-55
WP-16
MW-56
MW-55A
SITE
E
WP-29
MW-71
MW-41A
MW-39
MW-71A
SITE
F
MW-39A
MW-41
MW-40
MW-40A
RW-51
SITE E
Corrective Action Compliance
Monitoring
30 TAC 335.166
N
W
E
S
300-FEET

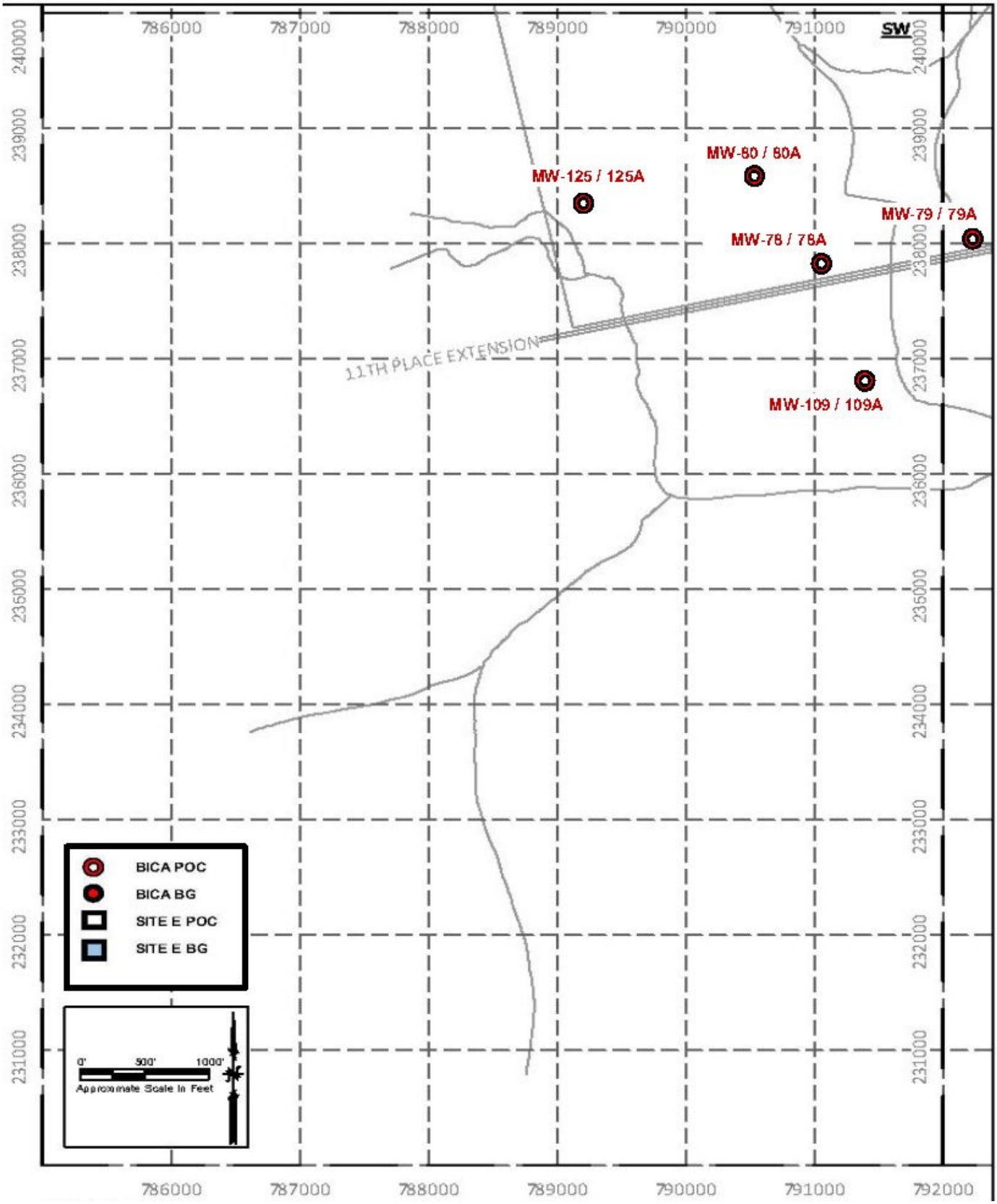

0 500' 2000'
Approximate Scale In Feet
NW
NE
SW
SE
KEY MAP


786000
787000
788000
789000
790000
791000
792000
250000
249000
248000
247000
246000
245000
244000
243000
242000
241000
240000
0'
500'
1000'
Approximate Scale in Feet
BICA POC
BICA BG
SITE E POC
SITE E BG
MW-52/52A
MW-76/76A
MW-221/221A
MW-227/227A
MW-225/225A
MW-38/38A
MW-39/39A
MW-41/41A
MW-152/152A
MW-153/153A
MW-40/40A
MW-154/154A
NW

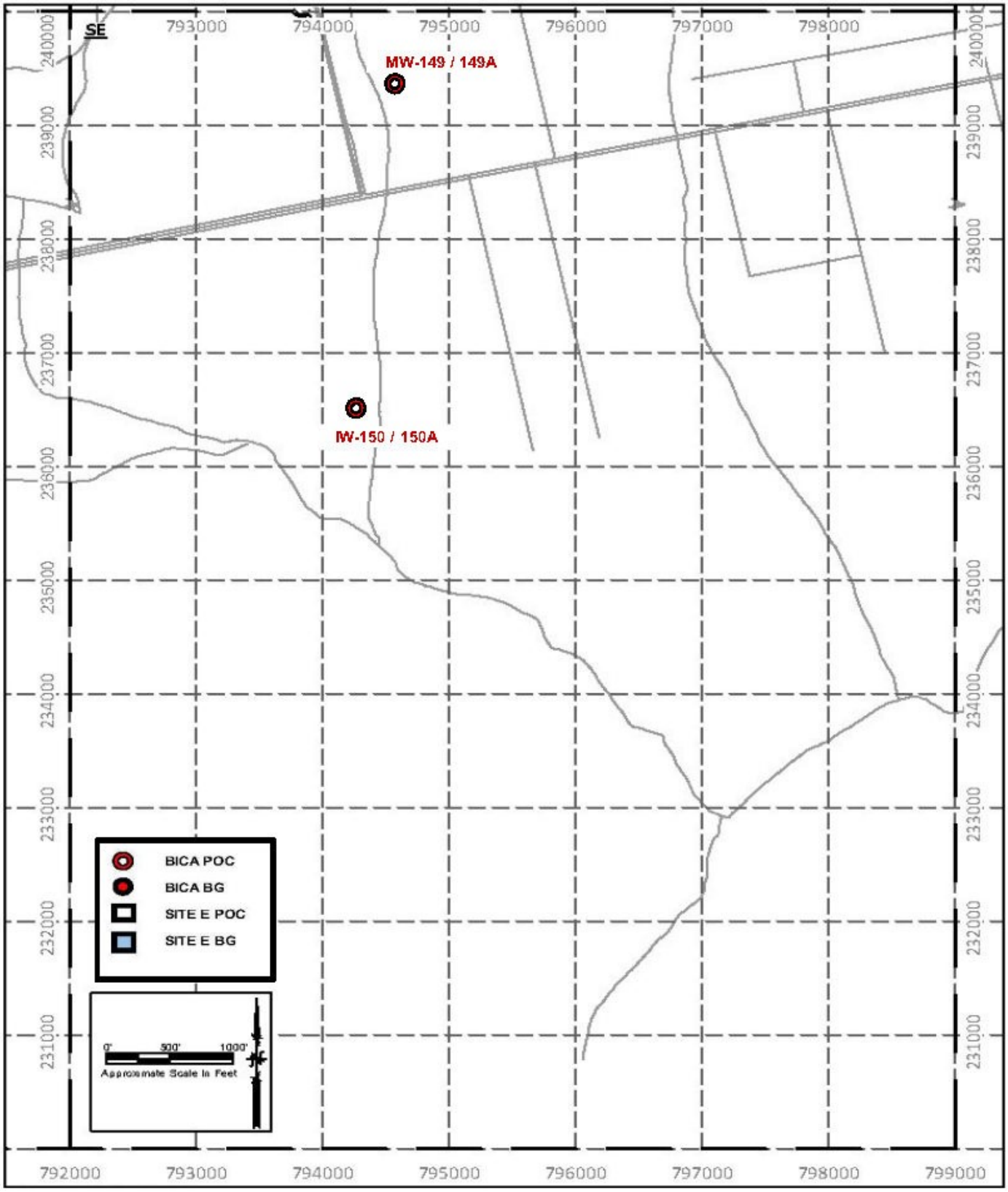
CP Attachment A_Sheet 10 of 12 Monitor Well Locations – Northeast Quadrant



CP Attachment A_Sheet 11 of 12 Monitor Well Locations – Southwest Quadrant



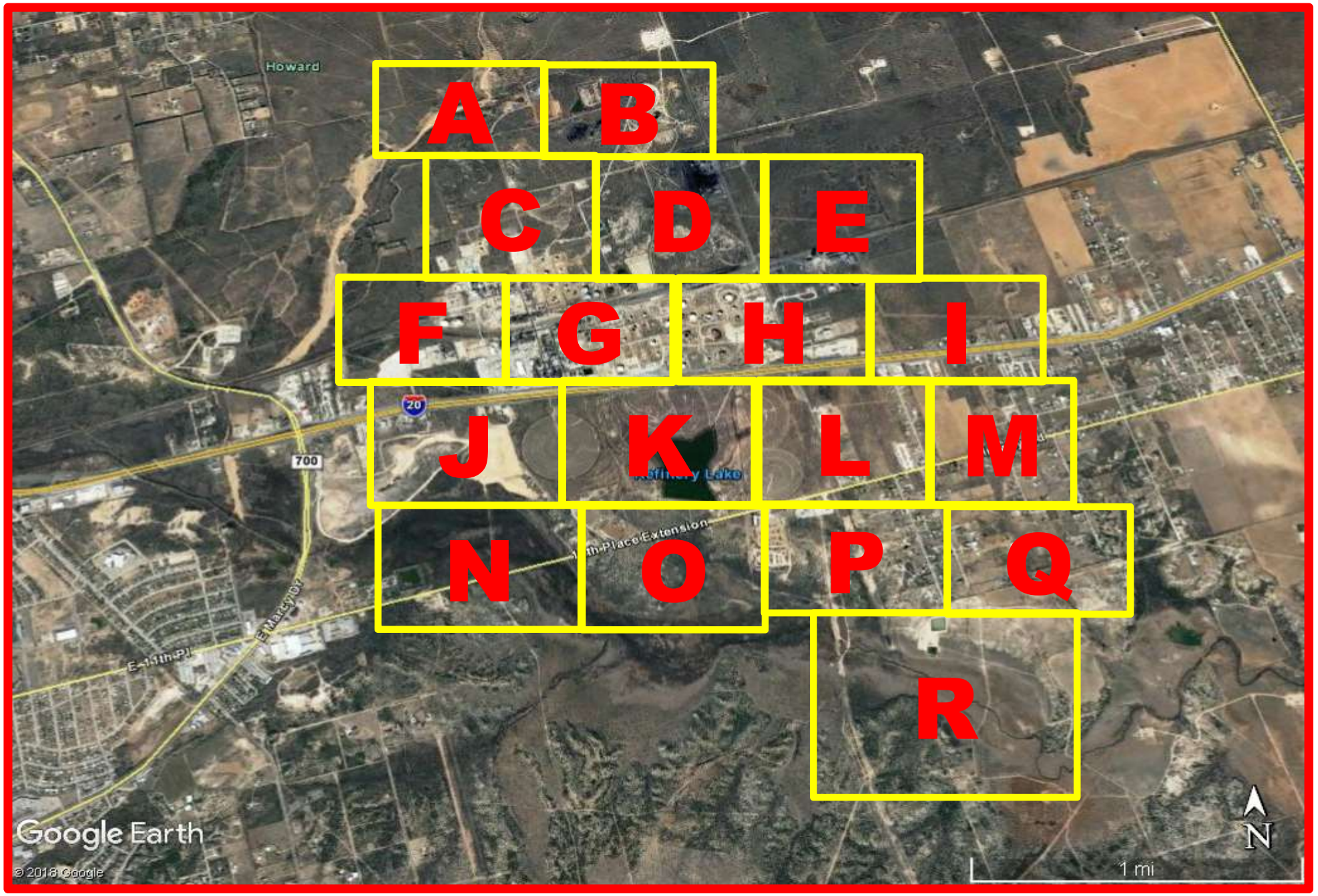
CP Attachment A_Sheet 12 of 12 Monitor Well Locations – Southeast Quadrant



Alon USA, LP
Alon USA Big Spring Refinery

Hazardous Waste Permit 50140
Part B Application
SWR No. 30083 / RN100250869 / CN600881783

APPENDIX XI
ATTACHMENT B
WELL DESIGN AND CONSTRUCTION SPECIFICATIONS



ATLAS

Attachment CP-B [A]

ORTHOGRAPHIC MAPS OF WELL LOCATIONS

ALON USA Big Spring Refinery

ORTHOGRAPHIC MAPS OF WELL LOCATIONS

Alon USA Big Spring Refinery

PANEL A

Revised: November 17, 2023

ORTHOGRAPHIC MAPS OF WELL LOCATIONS

Alon USA Big Spring Refinery

PANEL B

Revised: November 17, 2023

ORTHOGRAPHIC MAPS OF WELL LOCATIONS
Alon USA Big Spring Refinery
PANEL C

ORTHOGRAPHIC MAPS OF WELL LOCATIONS
Alon USA Big Spring Refinery
PANEL D

Revised: November 17, 2023

ORTHOGRAPHIC MAPS OF WELL LOCATIONS

Alon USA Big Spring Refinery

PANEL E

Revised: November 17, 2023

ORTHOGRAPHIC MAPS OF WELL LOCATIONS
Alon USA Big Spring Refinery
PANEL F

ORTHOGRAPHIC MAPS OF WELL LOCATIONS
Alon USA Big Spring Refinery
PANEL G

Rev. 1 07/15/2025 pg. 1560
Revised: November 17, 2023
Revised April 07, 2018

ORTHOGRAPHIC MAPS OF WELL LOCATIONS

Alon USA Big Spring Refinery

PANEL H

Revised: November 17, 2023

ORTHOGRAPHIC MAPS OF WELL LOCATIONS

Alon USA Big Spring Refinery

PANEL I

Revised: November 17, 2023

ORTHOGRAPHIC MAPS OF WELL LOCATIONS

Alon USA Big Spring Refinery

PANEL J

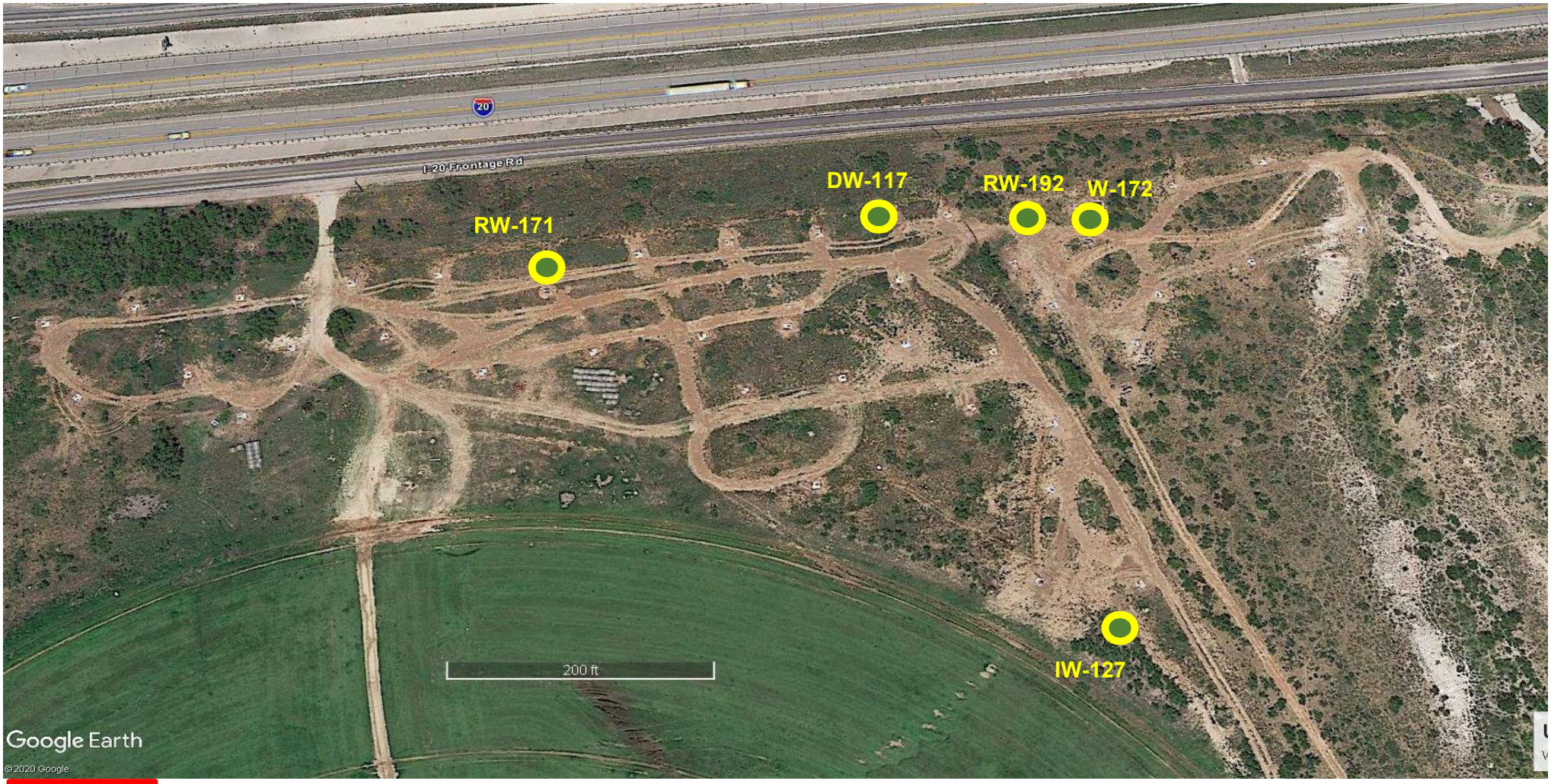
Revised: November 17, 2023

ORTHOGRAPHIC MAPS OF WELL LOCATIONS

Alon USA Big Spring Refinery

PANEL K

Revised: November 17, 2023



ORTHOGRAPHIC MAPS OF WELL LOCATIONS

Alon USA Big Spring Refinery

INSERT PANEL K2

Revised: November 17, 2023

ORTHOGRAPHIC MAPS OF WELL LOCATIONS

Alon USA Big Spring Refinery

PANEL L

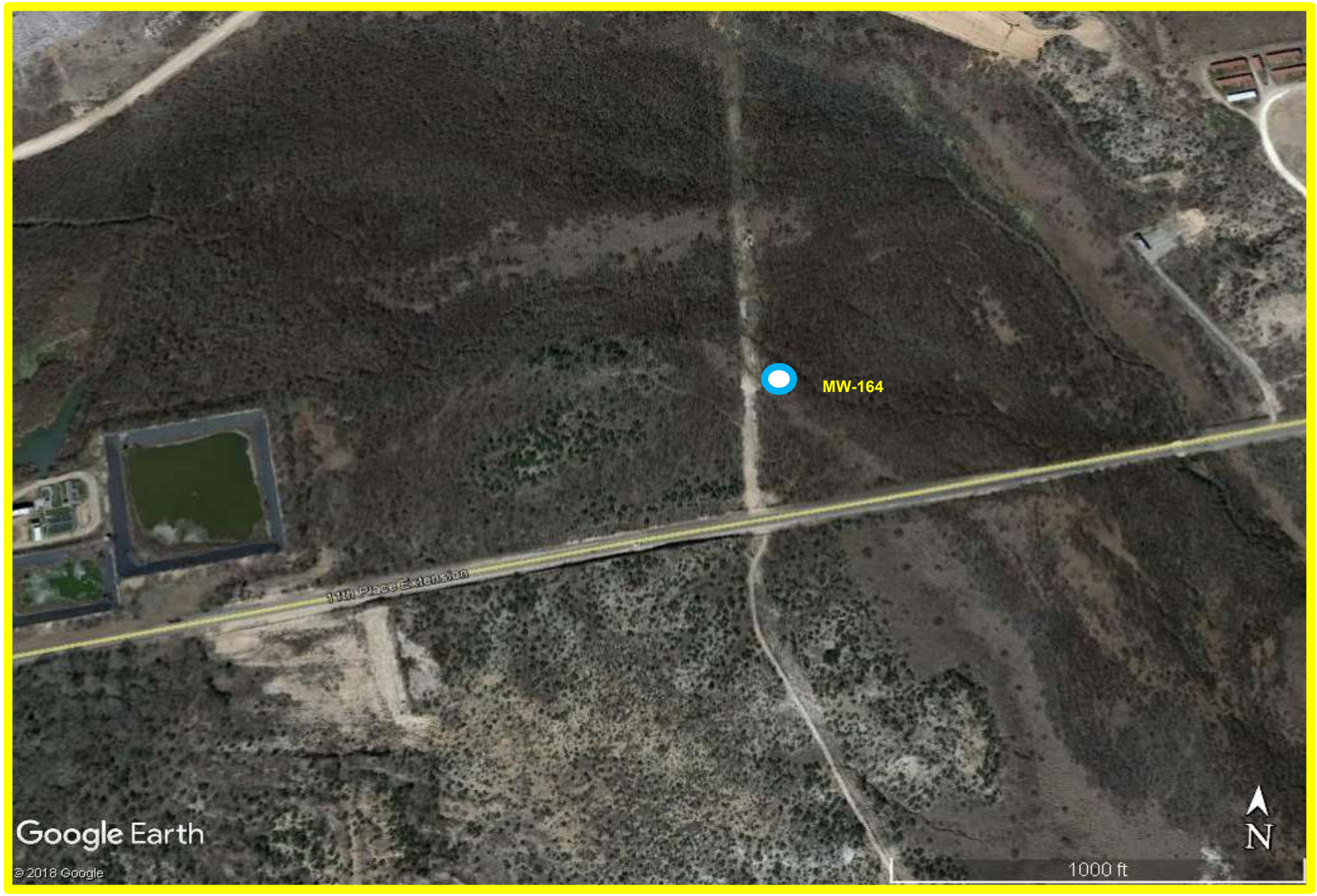
Revised: November 17, 2023

ORTHOGRAPHIC MAPS OF WELL LOCATIONS

Alon USA Big Spring Refinery

PANEL M

Revised: November 17, 2023



ORTHOGRAPHIC MAPS OF WELL LOCATIONS

Alon USA Big Spring Refinery

PANEL N

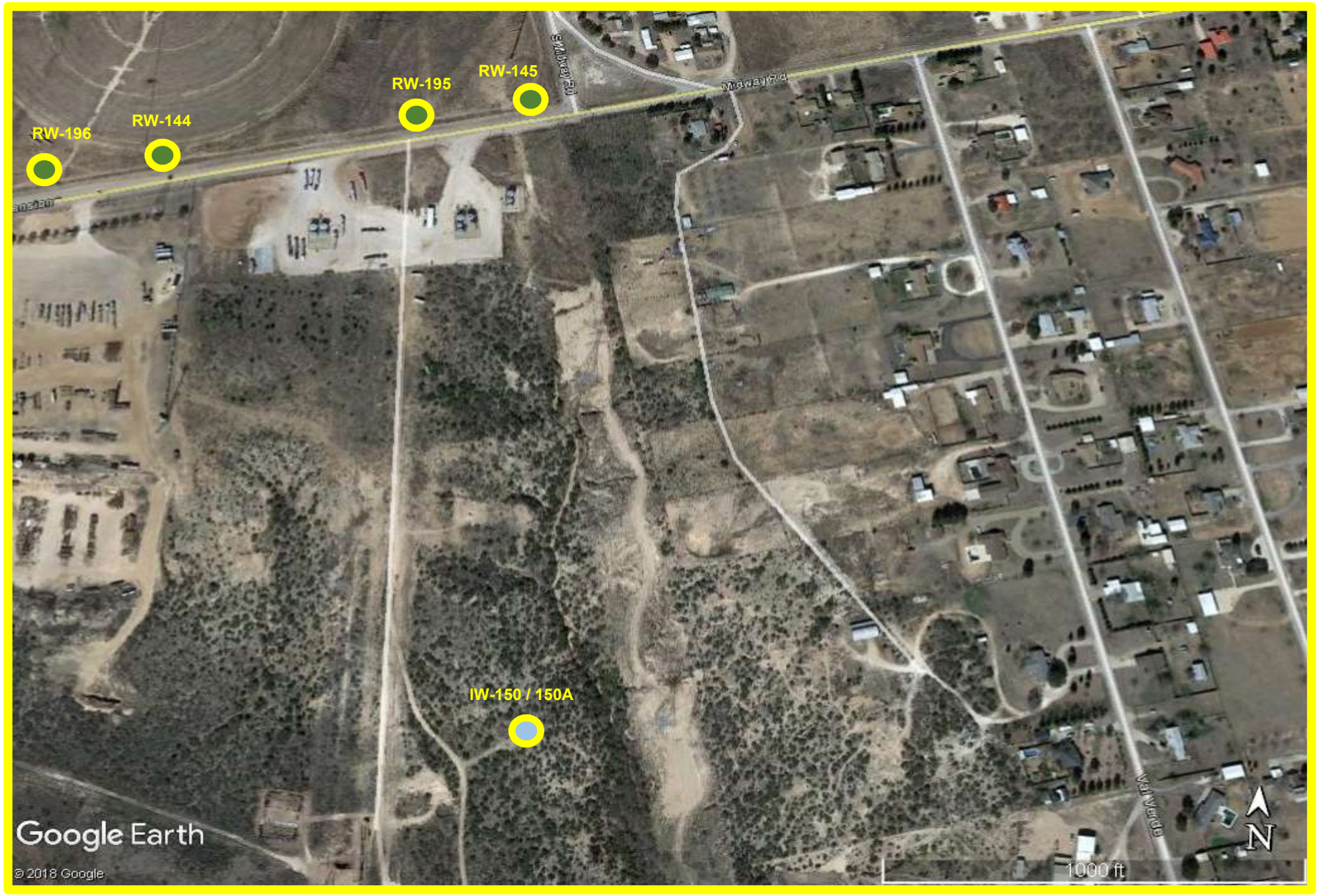
Revised: November 17, 2023

ORTHOGRAPHIC MAPS OF WELL LOCATIONS

Alon USA Big Spring Refinery

PANEL O

Revised: November 17, 2023



ORTHOGRAPHIC MAPS OF WELL LOCATIONS

Alon USA Big Spring Refinery

PANEL P

Revised: November 17, 2023

ORTHOGRAPHIC MAPS OF WELL LOCATIONS

Alon USA Big Spring Refinery

PANEL Q

Revised: November 17, 2023

ORTHOGRAPHIC MAPS OF WELL LOCATIONS

Alon USA Big Spring Refinery

PANEL R

Revised: November 17, 2023

CP ATTACHMENT B - TABLE CP-B [1]

Table of Remediation Well Construction Details (Item 13) [B]

Well Number	MW-38	MW-38A	MW-39	MW-39A	MW-40	MW-40A	MW-41	MW-41A	MW-52	MW-52A	MW-53
Unit	SITE E	SITE E	SITE E	SITE E	SITE E	SITE E	SITE E	SITE E	BICA/H	BICA/H	SITE H
Hole Diameter (in)	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8
Well Diameter (in)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Total Borehole Depth (ft)	120.0	160.0	109.0	140.0	107.0	130.0	113.0	135.0	120.0	160.0	130.0
Constructed Well Depth (ft)	115.0	146.0	99.0	130.0	107.0	128.0	113.0	130.8	125.0	157.0	116.0
Well Location Available (Y/N)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Map Panel Located [A]	D	D	G	G	G	G	G	G	B	B	B
Intended Use of Well	Sampling	Sampling	Sampling	Sampling	Sampling	Sampling	Sampling	Sampling	Sampling	Sampling	Sampling
Drilling & Lithologic Log Available (Y/N)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Drilling Method	Air Rotary w/mist	Air Rotary w/mist	Air Rotary w/mist	Air Rotary w/mist	Air Rotary w/mist	Air Rotary w/mist	Air Rotary w/mist	Air Rotary w/mist	Air Rotary w/mist	Air Rotary w/mist	Air Rotary w/mist
Data Drilled	Sep-87	Sep-87	Sep-87	Sep-87	Sep-87	Sep-87	Sep-87	Sep-87	Mar-89	Mar-89	Mar-89
Casing I.D. (in)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Casing Type/Materials	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC
How Joined?	Flush-threaded joints	Flush-threaded joints	Flush-threaded joints	Flush-threaded joints	Flush-threaded joints	Flush-threaded joints	Flush-threaded joints	Flush-threaded joints	Flush-threaded joints	Flush-threaded joints	Flush-threaded joints
Stick-up Length (ft-above grade)	3.0	2.8	2.9	2.8	3.0	2.3	3.1	3.1	2.8	2.7	3.2
Top of Casing (ft-MSL)	2500.28	2500.25	2485.47	2485.63	2480.01	2479.42	2489.34	2489.88	2517.86	2517.82	2511.27
Ground Surface Elevation (ft-MSL)	2497.28	2497.41	2482.59	2482.88	2477.03	2477.07	2486.26	2486.80	2515.10	2515.08	2508.11
Capped/Lockable (Y/N)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Well Head Protection	Locking Steel Case	Locking Steel Case	Locking Steel Case	Locking Steel Case	Locking Steel Case	Locking Steel Case	Locking Steel Case	Locking Steel Case	Locking Steel Case	Locking Steel Case	Locking Steel Case
Surface Pad Size (ft)	6' x 6' x 6"	6' x 6' x 6"	6' x 6' x 6"	6' x 6' x 6"	6' x 6' x 6"	6' x 6' x 6"	6' x 6' x 6"	6' x 6' x 6"	6' x 6' x 6"	6' x 6' x 6"	6' x 6' x 6"
Detailed drawing of well (Y/N)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Depth to Top Surface Seal - Cement (ft)	0	0	0	0	0	0	0	0	0	0	0
Surface seal design & Construction Available (Y/N)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Well Development Procedure available (Y/N)	YES - Air Hammer & Lift	YES - Air Hammer & Lift	YES - Air Hammer & Lift	YES - Air Hammer & Lift	YES - Air Hammer & Lift	YES - Air Hammer & Lift	YES - Air Hammer & Lift	YES - Air Hammer & Lift	YES - Air Hammer & Lift	YES - Air Hammer & Lift	YES - Air Hammer & Lift
Annulus Fill	Bentonite	Bentonite	Bentonite	Bentonite	Bentonite	Bentonite	Bentonite	Bentonite	Bentonite	Bentonite	Bentonite
Depth to Annulus Seal (ft)	88.0	101.0	72.0	91.0	80.0	103.0	82.0	100.0	99.8	131.9	91.0
Depth to Filter Pack (ft)	93.0	108.0	77.0	97.0	85.0	106.0	88.0	104.0	102.8	134.8	94.0
Depth to 1st Saturated Zone (ft)	96.0	96.0	80.0	80.0	88.0	88.0	91.0	91.0	115.0	115.0	98.0
Length of Gravel Pack (ft)	22.0	38.0	22.0	33.0	22.0	22.0	25.0	26.8	22.2	22.2	22.0
Size of Gravel Pack	8-16 Sieve Silica Sand	8-16 Sieve Silica Sand	8-16 Sieve Silica Sand	8-16 Sieve Silica Sand	8-16 Sieve Silica Sand	8-16 Sieve Silica Sand	8-16 Sieve Silica Sand	8-16 Sieve Silica Sand	8-16 Sieve Silica Sand	8-16 Sieve Silica Sand	8-16 Sieve Silica Sand
Filter Pack Volume (# bags)	16	31	19	26	13	14	15	18	10	15	21

CP ATTACHMENT B - TABLE CP-B [1]

Table of Remediation Well Construction Details (Item 13) [B]

Well Number	MW-38	MW-38A	MW-39	MW-39A	MW-40	MW-40A	MW-41	MW-41A	MW-52	MW-52A	MW-53
Unit	SITE E	SITE E	SITE E	SITE E	SITE E	SITE E	SITE E	SITE E	BICA/H	BICA/H	SITE H
Filter Pack Placement Method	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour
Depth to Top of screen (ft)	95.0	110.0	79.0	99.0	87.0	108.0	90.0	106.8	105.0	137.0	96.0
Sealant materials	Bentonite Pellets	Bentonite Pellets	Bentonite Pellets	Bentonite Pellets	Bentonite Pellets	Bentonite Pellets	Bentonite Pellets	Bentonite Pellets	Bentonite Pellets	Bentonite Pellets	Bentonite Pellets
Sealant Volume (# buckets)	3	3	3	3	3	3	3	3	3	3	3
Sealant placement method	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour
Sealant materials	Cement	Cement	Cement	Cement	Cement	Cement	Cement	Cement	Cement	Cement	Cement
Sealant Volume (# bags)	30	34	24	31	27	35	28	34	34	45	31
Sealant placement method	Trimie line Pump	Trimie line Pump	Trimie line Pump	Trimie line Pump	Trimie line Pump	Trimie line Pump	Trimie line Pump	Trimie line Pump	Trimie line Pump	Trimie line Pump	Trimie line Pump
Screen Slot Size (in)	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.010	0.010	0.010
Screen Type	Flush-threaded, mill-slot PVC	Flush-threaded, mill-slot PVC	Flush-threaded, mill-slot PVC	Flush-threaded, mill-slot PVC	Flush-threaded, mill-slot PVC	Flush-threaded, mill-slot PVC	Flush-threaded, mill-slot PVC	Flush-threaded, mill-slot PVC	Flush-threaded, mill-slot PVC	Flush-threaded, mill-slot PVC	Flush-threaded, mill-slot PVC
Screen Length (ft)	98.0	112.8	81.9	101.8	90.0	110.4	93.1	109.9	107.8	139.7	20.0
Blank Length (ft)	na	na	na	na	na	na	na	na	na	na	na
Devalopment Method	Air-Lift Hammer, Pump	Air-Lift Hammer, Pump	Air-Lift Hammer, Pump	Air-Lift Hammer, Pump	Air-Lift Hammer, Pump	Air-Lift Hammer, Pump	Air-Lift Hammer, Pump	Air-Lift Hammer, Pump	Air-Lift Hammer, Pump	Air-Lift Hammer, Pump	Air-Lift Hammer, Pump
Well Latitude Coordinate	32.2747	32.2747	32.2732	32.2731	32.2725	32.2725	32.2731	32.2732	32.2860	32.2860	32.2843
Well Longitude Coordinate	-101.4123	-101.4123	-101.4129	-101.4129	-101.4120	-101.4121	-101.4116	-101.4116	-101.4162	-101.4162	-101.4145

[A] - Map Panel of Well Location in Attachment CP-B [A]

[B] - See Attachment CP-B [B] for Monitoring Well Construction & Lithologic Logs

CP ATTACHMENT B - TABLE CP-B [1]

Table of Remediation Well Construction Details (Item 13) [B]

Well Number	MW-53A	MW-54	MW-54A	MW-74	MW-74A	MW-75	MW-75A	MW-76	MW-76A	MW-77	MW-77A
Unit	SITE H	SITE H	SITE H	SITE H	SITE H	SITE H	SITE H	BICA/H	BICA/H	SITE H	SITE H
Hole Diameter (in)	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8
Well Diameter (in)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Total Borehole Depth (ft)	140.0	150.0	150.0	120.0	170.0	130.0	160.0	130.0	180.0	130.0	160.0
Constructed Well Depth (ft)	137.0	118.5	138.0	114.0	146.0	115.0	155.0	120.0	158.0	120.0	150.0
Well Location Available (Y/N)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Map Panel Located [A]	B	B	B	B	B	B	B	B	B	B	B
Intended Use of Well	Sampling	Sampling	Sampling	Sampling	Sampling	Sampling	Sampling	Sampling	Sampling	Sampling	Sampling
Drilling & Lithologic Log Available (Y/N)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Drilling Method	Air Rotary w/mist	Air Rotary w/mist	Air Rotary w/mist	Air Rotary w/mist	Air Rotary w/mist	Air Rotary w/mist	Air Rotary w/mist	Air Rotary w/mist	Air Rotary w/mist	Air Rotary w/mist	Air Rotary w/mist
Data Drilled	Mar-89	Mar-89	Mar-89	Jun-92	Jun-92	Jun-92	Jun-92	Jun-92	Jun-92	Jun-92	Jun-92
Casing I.D. (in)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Casing Type/Materials	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC
How Joined?	Flush-threaded joints	Flush-threaded joints	Flush-threaded joints	Flush-threaded joints	Flush-threaded joints	Flush-threaded joints	Flush-threaded joints	Flush-threaded joints	Flush-threaded joints	Flush-threaded joints	Flush-threaded joints
Stick-up Length (ft-above grade)	3.1	1.8	2.0	2.9	3.0	1.7	1.7	2.8	2.9	2.8	2.9
Top of Casing (ft-MSL)	2511.12	2506.96	2507.27	2509.55	2509.54	2508.38	2508.38	2522.21	2521.89	2511.59	2511.86
Ground Surface Elevation (ft-MSL)	2507.99	2505.16	2505.31	2506.61	2506.54	2506.66	2506.65	2519.40	2518.99	2508.77	2508.99
Capped/Lockable (Y/N)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Well Head Protection	Locking Steel Case	Locking Steel Case	Locking Steel Case	Locking Steel Case	Locking Steel Case	Locking Steel Case	Locking Steel Case	Locking Steel Case	Locking Steel Case	Locking Steel Case	Locking Steel Case
Surface Pad Size (ft)	6' x 6' x 6"	6' x 6' x 6"	6' x 6' x 6"	6' x 6' x 6"	6' x 6' x 6"	6' x 6' x 6"	6' x 6' x 6"	6' x 6' x 6"	6' x 6' x 6"	6' x 6' x 6"	6' x 6' x 6"
Detailed drawing of well (Y/N)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Depth to Top Surface Seal - Cement (ft)	0	0	0	0	0	0	0	0	0	0	0
Surface seal design & Construction Available (Y/N)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Well Development Procedure available (Y/N)	YES - Air Hammer & Lift	YES - Air Hammer & Lift	YES - Air Hammer & Lift	YES - Air Hammer & Lift	YES - Air Hammer & Lift	YES - Air Hammer & Lift	YES - Air Hammer & Lift	YES - Air Hammer & Lift	YES - Air Hammer & Lift	YES - Air Hammer & Lift	YES - Air Hammer & Lift
Annulus Fill	Bentonite	Bentonite	Bentonite	Bentonite	Bentonite	Bentonite	Bentonite	Bentonite	Bentonite	Bentonite	Bentonite
Depth to Annulus Seal (ft)	110.0	90.0	112.0	82.0	99.0	84.0	115.0	89.0	108.0	81.0	118.0
Depth to Filter Pack (ft)	114.5	95.2	116.0	92.0	116.0	90.0	124.0	98.0	127.0	89.0	127.0
Depth to 1st Saturated Zone (ft)	98.0	98.0	98.0	95.0	95.0	96.0	96.0	101.0	101.0	101.0	101.0
Length of Gravel Pack (ft)	22.5	23.3	22.0	22.0	30.0	25.0	31.0	22.0	31.0	31.0	23.0
Size of Gravel Pack	8-16 Sieve Silica Sand	8-16 Sieve Silica Sand	8-16 Sieve Silica Sand	8-16 Sieve Silica Sand	8-16 Sieve Silica Sand	8-16 Sieve Silica Sand	8-16 Sieve Silica Sand	8-16 Sieve Silica Sand	8-16 Sieve Silica Sand	8-16 Sieve Silica Sand	8-16 Sieve Silica Sand
Filter Pack Volume (# bags)	15	33	20	17	32	24	21	19	32	24	20

CP ATTACHMENT B - TABLE CP-B [1]

Table of Remediation Well Construction Details (Item 13) [B]

Well Number	MW-53A	MW-54	MW-54A	MW-74	MW-74A	MW-75	MW-75A	MW-76	MW-76A	MW-77	MW-77A
Unit	SITE H	SITE H	SITE H	SITE H	SITE H	SITE H	SITE H	BICA/H	BICA/H	SITE H	SITE H
Filter Pack Placement Method	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour
Depth to Top of screen (ft)	117.0	98.5	118.0	94.0	126.0	95.0	135.0	100.0	138.0	100.0	130.0
Sealant materials	Bentonite Pellets	Bentonite Pellets	Bentonite Pellets	Bentonite Pellets	Bentonite Pellets	Bentonite Pellets	Bentonite Pellets	Bentonite Pellets	Bentonite Pellets	Bentonite Pellets	Bentonite Pellets
Sealant Volume (# buckets)	3	3	3	3	3	3	3	3	3	3	3
Sealant placement method	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour
Sealant materials	Cement	Cement	Cement	Cement	Cement	Cement	Cement	Cement	Cement	Cement	Cement
Sealant Volume (# bags)	37	31	38	28	34	29	39	30	37	28	40
Sealant placement method	Trimie line Pump	Trimie line Pump	Trimie line Pump	Trimie line Pump	Trimie line Pump	Trimie line Pump	Trimie line Pump	Trimie line Pump	Trimie line Pump	Trimie line Pump	Trimie line Pump
Screen Slot Size (in)	0.010	0.010	0.010	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
Screen Type	Flush-threaded, mill-slot PVC	Flush-threaded, mill-slot PVC	Flush-threaded, mill-slot PVC	Flush-threaded, mill-slot PVC	Flush-threaded, mill-slot PVC	Flush-threaded, mill-slot PVC	Flush-threaded, mill-slot PVC	Flush-threaded, mill-slot PVC	Flush-threaded, mill-slot PVC	Flush-threaded, mill-slot PVC	Flush-threaded, mill-slot PVC
Screen Length (ft)	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
Blank Length (ft)	na	na	na	na	na	na	na	na	na	na	na
Devalopment Method	Air-Lift Hammer, Pump	Air-Lift Hammer, Pump	Air-Lift Hammer, Pump	Air-Lift Hammer, Pump	Air-Lift Hammer, Pump	Air-Lift Hammer, Pump	Air-Lift Hammer, Pump	Air-Lift Hammer, Pump	Air-Lift Hammer, Pump	Air-Lift Hammer, Pump	Air-Lift Hammer, Pump
Well Latitude Coordinate	32.2843	32.2839	32.2839	32.2842	32.2842	32.2840	32.2840	32.2865	32.2865	32.2850	32.2851
Well Longitude Coordinate	-101.4146	-101.4164	-101.4163	-101.4150	-101.4150	-101.4158	-101.4158	-101.4146	-101.4146	-101.4162	-101.4162

[A] - Map Panel of Well Location in Attachment CP-B [A]

[B] - See Attachment CP-B [B] for Monitoring Well Construction & Lithologic Logs

CP ATTACHMENT B - TABLE CP-B [1]

Table of Remediation Well Construction Details (Item 13) [B]

Well Number	MW-78	MW-78A	MW-79	MW-79A	MW-80	MW-80A	MW-109	MW-109A	MW-125	MW-125A	IW-149
Unit	BICA	BICA	BICA	BICA	BICA	BICA	BICA	BICA	BICA	BICA	BICA
Hole Diameter (in)	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8
Well Diameter (in)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Total Borehole Depth (ft)	65.0	90.0	80.0	120.0	130.0	120.0	40.0	35.0	100.0	100.0	120.0
Constructed Well Depth (ft)	59.0	72.0	71.0	111.0	81.0	108.0	22.0	24.0	78.0	90.0	79.0
Well Location Available (Y/N)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Map Panel Located [A]	O	O	O	O	K	K	O	O	J	J	L
Intended Use of Well	Sampling	Sampling	Sampling	Sampling	Sampling	Sampling	Sampling	Sampling	Sampling	Sampling	Sampling
Drilling & Lithologic Log Available (Y/N)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Drilling Method	Air Rotary w/mist	Air Rotary w/mist	Air Rotary w/mist	Air Rotary w/mist	Air Rotary w/mist	Air Rotary w/mist	Air Rotary w/mist	Air Rotary w/mist	Air Rotary w/mist	Air Rotary w/mist	Air Rotary w/mist
Data Drilled	Jun-92	Jun-92	Jun-92	Jun-92	Jun-92	Jun-92	Feb-93	Feb-93	Nov-93	Nov-93	Mar-94
Casing I.D. (in)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Casing Type/Materials	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC
How Joined?	Flush-threaded joints	Flush-threaded joints	Flush-threaded joints	Flush-threaded joints	Flush-threaded joints	Flush-threaded joints	Flush-threaded joints	Flush-threaded joints	Flush-threaded joints	Flush-threaded joints	Flush-threaded joints
Stick-up Length (ft-above grade)	2.7	2.7	2.9	2.7	2.8	2.9	3.0	3.0	2.9	2.8	3.2
Top of Casing (ft-MSL)	2418.59	2418.85	2439.07	2438.74	2443.30	2442.71	2370.71	2370.47	2440.98	2440.81	2440.17
Ground Surface Elevation (ft-MSL)	2415.90	2416.19	2436.21	2436.01	2440.55	2439.85	2367.68	2367.48	2438.08	2437.98	2437.02
Capped/Lockable (Y/N)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Well Head Protection	Locking Steel Case	Locking Steel Case	Locking Steel Case	Locking Steel Case	Locking Steel Case	Locking Steel Case	Locking Steel Case	Locking Steel Case	Locking Steel Case	Locking Steel Case	Locking Steel Case
Surface Pad Size (ft)	6' x 6' x 6"	6' x 6' x 6"	6' x 6' x 6"	6' x 6' x 6"	6' x 6' x 6"	6' x 6' x 6"	6' x 6' x 6"	6' x 6' x 6"	6' x 6' x 6"	6' x 6' x 6"	6' x 6' x 6"
Detailed drawing of well (Y/N)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Depth to Top Surface Seal - Cement (ft)	0	0	0	0	0	0	0	0	0	0	0
Surface seal design & Construction Available (Y/N)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Well Development Procedure available (Y/N)	YES - Air Hammer & Lift	YES - Air Hammer & Lift	YES - Air Hammer & Lift	YES - Air Hammer & Lift	YES - Air Hammer & Lift	YES - Air Hammer & Lift	YES - Air Hammer & Lift	YES - Air Hammer & Lift	YES - Air Hammer & Lift	YES - Air Hammer & Lift	YES - Air Hammer & Lift
Annulus Fill	Bentonite	Bentonite	Bentonite	Bentonite	Bentonite	Bentonite	Bentonite	Bentonite	Bentonite	Bentonite	Bentonite
Depth to Annulus Seal (ft)	27.0	55.0	41.0	81.0	51.0	66.0	1.0	19.0	56.0	52.0	47.0
Depth to Filter Pack (ft)	34.0	63.0	48.0	89.0	57.0	73.0	2.0	22.0	60.0	56.0	52.0
Depth to 1st Saturated Zone (ft)	40.0	40.0	52.0	52.0	62.0	62.0	4.0	4.0	69.0	69.0	60.0
Length of Gravel Pack (ft)	25.0	9.0	23.0	22.0	24.0	35.0	20.0	2.0	18.0	34.0	27.0
Size of Gravel Pack	8-16 Sieve Silica Sand	8-16 Sieve Silica Sand	8-16 Sieve Silica Sand	8-16 Sieve Silica Sand	8-16 Sieve Silica Sand	8-16 Sieve Silica Sand	8-16 Sieve Silica Sand	8-16 Sieve Silica Sand	8-16 Sieve Silica Sand	8-16 Sieve Silica Sand	8-16 Sieve Silica Sand
Filter Pack Volume (# bags)	18	16	19	18	43	28	23	8	24	26	40

CP ATTACHMENT B - TABLE CP-B [1]

Table of Remediation Well Construction Details (Item 13) [B]

Well Number	MW-78	MW-78A	MW-79	MW-79A	MW-80	MW-80A	MW-109	MW-109A	MW-125	MW-125A	IW-149
Unit	BICA	BICA	BICA	BICA	BICA	BICA	BICA	BICA	BICA	BICA	BICA
Filter Pack Placement Method	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour
Depth to Top of screen (ft)	39.0	66.0	51.0	91.0	61.0	78.0	3.0	14.0	68.0	70.0	59.0
Sealant materials	Bentonite Pellets	Bentonite Pellets	Bentonite Pellets	Bentonite Pellets	Bentonite Pellets	Bentonite Pellets	Bentonite Pellets	Bentonite Pellets	Bentonite Pellets	Bentonite Pellets	Bentonite Pellets
Sealant Volume (# buckets)	3	3	3	3	3	3	3	3	3	3	3
Sealant placement method	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour
Sealant materials	Cement	Cement	Cement	Cement	Cement	Cement	Cement	Cement	Cement	Cement	Cement
Sealant Volume (# bags)	9	19	14	28	17	22	0	6	19	18	16
Sealant placement method	Trimie line Pump	Trimie line Pump	Trimie line Pump	Trimie line Pump	Trimie line Pump	Trimie line Pump	Trimie line Pump	Trimie line Pump	Trimie line Pump	Trimie line Pump	Trimie line Pump
Screen Slot Size (in)	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.010
Screen Type	Flush-threaded, mill-slot PVC	Flush-threaded, mill-slot PVC	Flush-threaded, mill-slot PVC	Flush-threaded, mill-slot PVC	Flush-threaded, mill-slot PVC	Flush-threaded, mill-slot PVC	Flush-threaded, mill-slot PVC	Flush-threaded, mill-slot PVC	Flush-threaded, mill-slot PVC	Flush-threaded, mill-slot PVC	Flush-threaded, mill-slot PVC
Screen Length (ft)	20.0	6.0	20.0	20.0	20.0	30.0	6.0	17.0	70.9	72.8	62.2
Blank Length (ft)	na	na	na	na	na	na	na	na	na	na	na
Devalopment Method	Air-Lift Hammer, Pump	Air-Lift Hammer, Pump	Air-Lift Hammer, Pump	Air-Lift Hammer, Pump	Air-Lift Hammer, Pump	Air-Lift Hammer, Pump	Air-Lift Hammer, Pump	Air-Lift Hammer, Pump	Air-Lift Hammer, Pump	Air-Lift Hammer, Pump	Air-Lift Hammer, Pump
Well Latitude Coordinate	32.2584	32.2584	32.2591	32.2591	32.2604	32.2605	32.2555	32.2555	32.2601	32.2601	32.2633
Well Longitude Coordinate	-101.4117	-101.4117	-101.4080	-101.4080	-101.4140	-101.4140	-101.4105	-101.4105	-101.4181	-101.4181	-101.4009

[A] - Map Panel of Well Location in Attachment CP-B [A]

[B] - See Attachment CP-B [B] for Monitoring Well Construction & Lithologic Logs

CP ATTACHMENT B - TABLE CP-B [1]

Table of Remediation Well Construction Details (Item 13) [B]

Well Number	IW-149A	IW-150	IW-150A	MW-152	MW-152A	MW-153	MW-153A	MW-154	MW-154A	MW-155	MW-155A
Unit	BICA	BICA	BICA	BICA	BICA	BICA	BICA	BICA	BICA	BICA	BICA
Hole Diameter (in)	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8
Well Diameter (in)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Total Borehole Depth (ft)	110.0	60.0	60.0	115.0	135.0	90.0	100.0	120.0	120.0	97.0	120.0
Constructed Well Depth (ft)	97.5	37.0	48.0	98.0	116.0	77.0	87.0	85.0	102.0	88.0	107.0
Well Location Available (Y/N)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Map Panel Located [A]	L	P	P	F	F	F	F	J	J	I	I
Intended Use of Well	Sampling	Sampling	Sampling	Sampling	Sampling	Sampling	Sampling	Sampling	Sampling	Sampling	Sampling
Drilling & Lithologic Log Available (Y/N)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Drilling Method	Air Rotary w/mist	Air Rotary w/mist	Air Rotary w/mist	Air Rotary w/mist	Air Rotary w/mist	Air Rotary w/mist	Air Rotary w/mist	Air Rotary w/mist	Air Rotary w/mist	Air Rotary w/mist	Air Rotary w/mist
Data Drilled	Mar-94	Mar-94	Mar-94	Jun-94	Jun-94	Jun-94	Jun-94	Jun-94	Jun-94	Oct-94	Oct-94
Casing I.D. (in)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Casing Type/Materials	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC
How Joined?	Flush-threaded joints	Flush-threaded joints	Flush-threaded joints	Flush-threaded joints	Flush-threaded joints	Flush-threaded joints	Flush-threaded joints	Flush-threaded joints	Flush-threaded joints	Flush-threaded joints	Flush-threaded joints
Stick-up Length (ft-above grade)	3.2	3.2	3.2	2.7	2.7	2.8	2.7	2.7	2.7	3.0	2.9
Top of Casing (ft-MSL)	2440.23	2394.79	2394.83	2475.86	2475.86	2456.19	2456.34	2451.56	2451.58	2455.65	2455.11
Ground Surface Elevation (ft-MSL)	2437.01	2391.61	2391.61	2473.21	2473.20	2453.38	2453.65	2448.90	2448.91	2452.70	2452.20
Capped/Lockable (Y/N)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Well Head Protection	Locking Steel Case	Locking Steel Case	Locking Steel Case	Locking Steel Case	Locking Steel Case	Locking Steel Case	Locking Steel Case	Locking Steel Case	Locking Steel Case	Locking Steel Case	Locking Steel Case
Surface Pad Size (ft)	6' x 6' x 6"	6' x 6' x 6"	6' x 6' x 6"	6' x 6' x 6"	6' x 6' x 6"	6' x 6' x 6"	6' x 6' x 6"	6' x 6' x 6"	6' x 6' x 6"	6' x 6' x 6"	6' x 6' x 6"
Detailed drawing of well (Y/N)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Depth to Top Surface Seal - Cement (ft)	0	0	0	0	0	0	0	0	0	0	0
Surface seal design & Construction Available (Y/N)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Well Development Procedure available (Y/N)	YES - Air Hammer & Lift	YES - Air Hammer & Lift	YES - Air Hammer & Lift	YES - Air Hammer & Lift	YES - Air Hammer & Lift	YES - Air Hammer & Lift	YES - Air Hammer & Lift	YES - Air Hammer & Lift	YES - Air Hammer & Lift	YES - Air Hammer & Lift	YES - Air Hammer & Lift
Annulus Fill	Bentonite	Bentonite	Bentonite	Bentonite	Bentonite	Bentonite	Bentonite	Bentonite	Bentonite	Bentonite	Bentonite
Depth to Annulus Seal (ft)	76.0	10.0	27.0	62.0	96.0	48.0	66.0	55.0	83.0	60.0	86.0
Depth to Filter Pack (ft)	83.0	16.0	33.0	71.0	104.0	55.0	72.0	60.0	87.0	65.0	90.0
Depth to 1st Saturated Zone (ft)	60.0	28.0	28.0	79.0	79.0	60.0	60.0	66.0	66.0	69.0	69.0
Length of Gravel Pack (ft)	14.5	21.0	15.0	27.0	12.0	22.0	15.0	25.0	15.0	23.0	17.0
Size of Gravel Pack	8-16 Sieve Silica Sand	8-16 Sieve Silica Sand	8-16 Sieve Silica Sand	8-16 Sieve Silica Sand	8-16 Sieve Silica Sand	8-16 Sieve Silica Sand	8-16 Sieve Silica Sand	8-16 Sieve Silica Sand	8-16 Sieve Silica Sand	8-16 Sieve Silica Sand	8-16 Sieve Silica Sand
Filter Pack Volume (# bags)	16	26	16	26	18	21	17	36	20	19	18

CP ATTACHMENT B - TABLE CP-B [1]

Table of Remediation Well Construction Details (Item 13) [B]

Well Number	IW-149A	IW-150	IW-150A	MW-152	MW-152A	MW-153	MW-153A	MW-154	MW-154A	MW-155	MW-155A
Unit	BICA	BICA	BICA	BICA	BICA	BICA	BICA	BICA	BICA	BICA	BICA
Filter Pack Placement Method	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour
Depth to Top of screen (ft)	85.0	27.0	38.0	78.0	106.0	57.0	77.0	65.0	92.0	68.0	97.0
Sealant materials	Bentonite Pellets	Bentonite Pellets	Bentonite Pellets	Bentonite Pellets	Bentonite Pellets	Bentonite Pellets	Bentonite Pellets	Bentonite Pellets	Bentonite Pellets	Bentonite Pellets	Bentonite Pellets
Sealant Volume (# buckets)	3	3	3	3	3	3	3	3	3	3	3
Sealant placement method	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour
Sealant materials	Cement	Cement	Cement	Cement	Cement	Cement	Cement	Cement	Cement	Cement	Cement
Sealant Volume (# bags)	26	3	9	21	33	16	22	19	28	20	29
Sealant placement method	Trimie line Pump	Trimie line Pump	Trimie line Pump	Trimie line Pump	Trimie line Pump	Trimie line Pump	Trimie line Pump	Trimie line Pump	Trimie line Pump	Trimie line Pump	Trimie line Pump
Screen Slot Size (in)	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Screen Type	Flush-threaded, mill-slot PVC	Flush-threaded, mill-slot PVC	Flush-threaded, mill-slot PVC	Flush-threaded, mill-slot PVC	Flush-threaded, mill-slot PVC	Flush-threaded, mill-slot PVC	Flush-threaded, mill-slot PVC	Flush-threaded, mill-slot PVC	Flush-threaded, mill-slot PVC	Flush-threaded, mill-slot PVC	Flush-threaded, mill-slot PVC
Screen Length (ft)	88.2	30.2	41.2	80.7	108.7	59.8	79.7	67.7	94.7	71.0	99.9
Blank Length (ft)	na	na	na	na	na	na	na	na	na	na	na
Devalopment Method	Air-Lift Hammer, Pump	Air-Lift Hammer, Pump	Air-Lift Hammer, Pump	Air-Lift Hammer, Pump	Air-Lift Hammer, Pump	Air-Lift Hammer, Pump	Air-Lift Hammer, Pump	Air-Lift Hammer, Pump	Air-Lift Hammer, Pump	Air-Lift Hammer, Pump	Air-Lift Hammer, Pump
Well Latitude Coordinate	32.2634	32.2553	32.2552	32.2714	32.2714	32.2708	32.2708	32.2651	32.2651	32.2675	32.2675
Well Longitude Coordinate	-101.4009	-101.4015	-101.4015	-101.4230	-101.4230	-101.4271	-101.4271	-101.4250	-101.4250	-101.3980	-101.3981

[A] - Map Panel of Well Location in Attachment CP-B [A]

[B] - See Attachment CP-B [B] for Monitoring Well Construction & Lithologic Logs

CP ATTACHMENT B - TABLE CP-B [1]

Table of Remediation Well Construction Details (Item 13) [B]

Well Number	MW-214	MW-214A	MW-218	MW-218A	MW-220	MW-220A	MW-221	MW-221A	MW-223	MW-223A	MW-224
Unit	BICA	BICA	BICA	BICA	BICA	BICA	BICA	BICA	BICA	BICA	BICA
Hole Diameter (in)	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8
Well Diameter (in)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Total Borehole Depth (ft)	120.0	130.0	105.0	103.0	115.0	140.0	130.0	160.0	120.0	150.0	140.0
Constructed Well Depth (ft)	98.0	120.0	100.0	116.0	109.0	135.0	123.0	155.0	118.0	145.0	131.0
Well Location Available (Y/N)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Map Panel Located [A]	E	E	H	H	D	D	D	D	B	B	B
Intended Use of Well	Sampling	Sampling	Sampling	Sampling	Sampling	Sampling	Sampling	Sampling	Sampling	Sampling	Sampling
Drilling & Lithologic Log Available (Y/N)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Drilling Method	Air Rotary w/mist	Air Rotary w/mist	Air Rotary w/mist	Air Rotary w/mist	Air Rotary w/mist	Air Rotary w/mist	Air Rotary w/mist	Air Rotary w/mist	Air Rotary w/mist	Air Rotary w/mist	Air Rotary w/mist
Data Drilled	Jan-97	Feb-97	Feb-97	Jan-97	Nov-97	Oct-97	Oct-97	Oct-97	Oct-97	Oct-97	Nov-97
Casing I.D. (in)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Casing Type/Materials	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC
How Joined?	Flush-threaded joints	Flush-threaded joints	Flush-threaded joints	Flush-threaded joints	Flush-threaded joints	Flush-threaded joints	Flush-threaded joints	Flush-threaded joints	Flush-threaded joints	Flush-threaded joints	Flush-threaded joints
Stick-up Length (ft-above grade)	3.0	3.0	3.3	3.0	3.1	2.9	3.2	3.1	3.1	2.9	3.1
Top of Casing (ft-MSL)	2477.46	2477.59	2468.14	2467.84	2492.53	2492.95	2512.68	2512.56	2505.30	2506.46	2521.92
Ground Surface Elevation (ft-MSL)	2474.45	2474.58	2464.84	2464.82	2489.46	2490.05	2509.49	2509.43	2502.17	2503.51	2518.80
Capped/Lockable (Y/N)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Well Head Protection	Locking Steel Case	Locking Steel Case	Locking Steel Case	Locking Steel Case	Locking Steel Case	Locking Steel Case	Locking Steel Case	Locking Steel Case	Locking Steel Case	Locking Steel Case	Locking Steel Case
Surface Pad Size (ft)	6' x 6' x 6"	6' x 6' x 6"	6' x 6' x 6"	6' x 6' x 6"	6' x 6' x 6"	6' x 6' x 6"	6' x 6' x 6"	6' x 6' x 6"	6' x 6' x 6"	6' x 6' x 6"	6' x 6' x 6"
Detailed drawing of well (Y/N)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Depth to Top Surface Seal - Cement (ft)	0	0	0	0	0	0	0	0	0	0	0
Surface seal design & Construction Available (Y/N)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Well Development Procedure available (Y/N)	YES - Air Hammer & Lift	YES - Air Hammer & Lift	YES - Air Hammer & Lift	YES - Air Hammer & Lift	YES - Air Hammer & Lift	YES - Air Hammer & Lift	YES - Air Hammer & Lift	YES - Air Hammer & Lift	YES - Air Hammer & Lift	YES - Air Hammer & Lift	YES - Air Hammer & Lift
Annulus Fill	Bentonite	Bentonite	Bentonite	Bentonite	Bentonite	Bentonite	Bentonite	Bentonite	Bentonite	Bentonite	Bentonite
Depth to Annulus Seal (ft)	70.5	107.0	72.0	99.0	80.0	122.0	95.0	136.0	85.0	131.0	101.0
Depth to Filter Pack (ft)	74.0	113.0	77.0	104.0	86.0	127.0	100.0	146.0	94.0	135.0	106.0
Depth to 1st Saturated Zone (ft)	79.0	79.0	81.0	81.0	95.0	95.0	115.0	115.0	101.0	101.0	120.0
Length of Gravel Pack (ft)	24.0	7.0	23.0	12.0	23.0	8.0	23.0	9.0	24.0	10.0	25.0
Size of Gravel Pack	8-16 Sieve Silica Sand	8-16 Sieve Silica Sand	8-16 Sieve Silica Sand	8-16 Sieve Silica Sand	8-16 Sieve Silica Sand	8-16 Sieve Silica Sand	8-16 Sieve Silica Sand	8-16 Sieve Silica Sand	8-16 Sieve Silica Sand	8-16 Sieve Silica Sand	8-16 Sieve Silica Sand
Filter Pack Volume (# bags)	27	10	17	5	17	8	18	8	15	9	20

CP ATTACHMENT B - TABLE CP-B [1]

Table of Remediation Well Construction Details (Item 13) [B]

Well Number	MW-214	MW-214A	MW-218	MW-218A	MW-220	MW-220A	MW-221	MW-221A	MW-223	MW-223A	MW-224
Unit	BICA	BICA	BICA	BICA	BICA	BICA	BICA	BICA	BICA	BICA	BICA
Filter Pack Placement Method	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour
Depth to Top of screen (ft)	78.0	115.0	80.0	111.0	89.0	130.0	103.0	150.0	98.0	140.0	111.0
Sealant materials	Bentonite Pellets	Bentonite Pellets	Bentonite Pellets	Bentonite Pellets	Bentonite Pellets	Bentonite Pellets	Bentonite Pellets	Bentonite Pellets	Bentonite Pellets	Bentonite Pellets	Bentonite Pellets
Sealant Volume (# buckets)	3	3	3	3	3	3	3	3	3	3	3
Sealant placement method	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour
Sealant materials	Cement	Cement	Cement	Cement	Cement	Cement	Cement	Cement	Cement	Cement	Cement
Sealant Volume (# bags)	24	36	24	34	27	41	32	46	29	45	34
Sealant placement method	Trimie line Pump	Trimie line Pump	Trimie line Pump	Trimie line Pump	Trimie line Pump	Trimie line Pump	Trimie line Pump	Trimie line Pump	Trimie line Pump	Trimie line Pump	Trimie line Pump
Screen Slot Size (in)	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
Screen Type	Flush-threaded, mill-slot PVC	Flush-threaded, mill-slot PVC	Flush-threaded, mill-slot PVC	Flush-threaded, mill-slot PVC	Flush-threaded, mill-slot PVC	Flush-threaded, mill-slot PVC	Flush-threaded, mill-slot PVC	Flush-threaded, mill-slot PVC	Flush-threaded, mill-slot PVC	Flush-threaded, mill-slot PVC	Flush-threaded, mill-slot PVC
Screen Length (ft)	81.0	118.0	83.3	114.0	92.1	132.9	106.2	153.1	101.1	143.0	114.1
Blank Length (ft)	na	na	na	na	na	na	na	na	na	na	na
Devalopment Method	Air-Lift Hammer, Pump	Air-Lift Hammer, Pump	Air-Lift Hammer, Pump	Air-Lift Hammer, Pump	Air-Lift Hammer, Pump	Air-Lift Hammer, Pump	Air-Lift Hammer, Pump	Air-Lift Hammer, Pump	Air-Lift Hammer, Pump	Air-Lift Hammer, Pump	Air-Lift Hammer, Pump
Well Latitude Coordinate	32.2747	32.2747	32.2703	32.2703	32.2778	32.2778	32.2806	32.2806	32.2816	32.2816	32.2834
Well Longitude Coordinate	-101.4039	-101.4039	-101.4010	-101.4011	-101.4070	-101.4070	-101.4125	-101.4124	-101.4085	-101.4085	-101.4089

[A] - Map Panel of Well Location in Attachment CP-B [A]

[B] - See Attachment CP-B [B] for Monitoring Well Construction & Lithologic Logs

CP ATTACHMENT B - TABLE CP-B [1]

Table of Remediation Well Construction Details (Item 13) [B]

Well Number	MW-224A	MW-225	MW-225A	MW-227	MW-227A
Unit	BICA	BICA	BICA	BICA	BICA
Hole Diameter (in)	6.8	6.8	6.8	6.8	6.8
Well Diameter (in)	2.0	2.0	2.0	2.0	2.0
Total Borehole Depth (ft)	160.0	100.0	115.0	110.0	128.0
Constructed Well Depth (ft)	157.0	97.0	110.0	99.0	124.0
Well Location Available (Y/N)	YES	YES	YES	YES	YES
Map Panel Located [A]	B	C	C	C	C
Intended Use of Well	Sampling	Sampling	Sampling	Sampling	Sampling
Drilling & Lithologic Log Available (Y/N)	YES	YES	YES	YES	YES
Drilling Method	Air Rotary w/mist	Air Rotary w/mist	Air Rotary w/mist	Air Rotary w/mist	Air Rotary w/mist
Data Drilled	Oct-97	Nov-97	Nov-97	Nov-97	Oct-97
Casing I.D. (in)	2.0	2.0	2.0	2.0	2.0
Casing Type/Materials	PVC	PVC	PVC	PVC	PVC
How Joined?	Flush-threaded joints	Flush-threaded joints	Flush-threaded joints	Flush-threaded joints	Flush-threaded joints
Stick-up Length (ft-above grade)	3.1	2.8	3.1	2.8	3.0
Top of Casing (ft-MSL)	2521.54	2476.92	2477.25	2486.14	2486.81
Ground Surface Elevation (ft-MSL)	2518.45	2474.13	2474.19	2483.39	2483.78
Capped/Lockable (Y/N)	YES	YES	YES	YES	YES
Well Head Protection	Locking Steel Case	Locking Steel Case	Locking Steel Case	Locking Steel Case	Locking Steel Case
Surface Pad Size (ft)	6' x 6' x 6"	6' x 6' x 6"	6' x 6' x 6"	6' x 6' x 6"	6' x 6' x 6"
Detailed drawing of well (Y/N)	YES	YES	YES	YES	YES
Depth to Top Surface Seal - Cement (ft)	0	0	0	0	0
Surface seal design & Construction Available (Y/N)	YES	YES	YES	YES	YES
Well Development Procedure available (Y/N)	YES - Air Hammer & Lift	YES - Air Hammer & Lift	YES - Air Hammer & Lift	YES - Air Hammer & Lift	YES - Air Hammer & Lift
Annulus Fill	Bentonite	Bentonite	Bentonite	Bentonite	Bentonite
Depth to Annulus Seal (ft)	143.0	67.0	96.0	72.0	112.5
Depth to Filter Pack (ft)	147.5	73.0	102.0	77.0	115.5
Depth to 1st Saturated Zone (ft)	120.0	78.0	78.0	83.0	83.0
Length of Gravel Pack (ft)	9.5	24.0	8.0	22.0	8.5
Size of Gravel Pack	8-16 Sieve Silica Sand	8-16 Sieve Silica Sand	8-16 Sieve Silica Sand	8-16 Sieve Silica Sand	8-16 Sieve Silica Sand
Filter Pack Volume (# bags)	7	16	8	20	7

CP ATTACHMENT B - TABLE CP-B [1]

Table of Remediation Well Construction Details (Item 13) [B]

Well Number	MW-224A	MW-225	MW-225A	MW-227	MW-227A
Unit	BICA	BICA	BICA	BICA	BICA
Filter Pack Placement Method	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour
Depth to Top of screen (ft)	152.0	77.0	105.0	79.0	119.0
Sealant materials	Bentonite Pellets	Bentonite Pellets	Bentonite Pellets	Bentonite Pellets	Bentonite Pellets
Sealant Volume (# buckets)	3	3	3	3	3
Sealant placement method	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour
Sealant materials	Cement	Cement	Cement	Cement	Cement
Sealant Volume (# bags)	49	23	33	24	38
Sealant placement method	Trimie line Pump	Trimie line Pump	Trimie line Pump	Trimie line Pump	Trimie line Pump
Screen Slot Size (in)	0.020	0.020	0.020	0.020	0.020
Screen Type	Flush-threaded, mill-slot PVC	Flush-threaded, mill-slot PVC	Flush-threaded, mill-slot PVC	Flush-threaded, mill-slot PVC	Flush-threaded, mill-slot PVC
Screen Length (ft)	155.1	79.8	108.1	81.8	122.0
Blank Length (ft)	na	na	na	na	na
Devalopment Method	Air-Lift Hammer, Pump	Air-Lift Hammer, Pump	Air-Lift Hammer, Pump	Air-Lift Hammer, Pump	Air-Lift Hammer, Pump
Well Latitude Coordinate	32.2834	32.2747	32.2747	32.2780	32.2780
Well Longitude Coordinate	-101.4089	-101.4235	-101.4235	-101.4241	-101.4242

[A] - Map Panel of Well Location in Attachment CP-B [A]

[B] - See Attachment CP-B [B] for Monitoring Well Construction & Lithologic Logs

CP ATTACHMENT B - TABLE CP-B [2]

Table of Remediation Well Construction Details (Item 13)[C]

Well Number	P-3	RW-106	RW-112	DW-117	IW-127	RW-140	RW-141	RW-142	RW-143	RW-144	RW-145
Unit	CAS: Dual-Phase	CAS: Dual-Phase	CAS: South Boundary	CAS: Dual-Phase	CAS: Dual-Phase	CAS: South Boundary	CAS: South Boundary	CAS: South Boundary	CAS: South Boundary	CAS: South Boundary	CAS: South Boundary
Hole Diameter (in)	15	12.25	12.25	6.8	6.8	12.25	12.25	12.25	12.25	12.25	12.25
Well Diameter (in)	8.0	6.0	6.0	2.0	2.0	6.0	6.0	6.0	6.0	6.0	6.0
Total Borehole Depth (ft)	107.0	85.0	60.0	110.0	120.0	60.0	80.0	110.0	120.0	120.0	100.0
Constructed Well Depth (ft)	63.0	85.0	35.0	96.0	106.0	32.0	51.0	80.0	85.0	82.0	77.0
Well Location Available (Y/N)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Map Panel Located [A]	G	K	O	K2	K2	O	O	O	O	P	P
Intended Use of Well	Water & LNAPL Recovery	Water & LNAPL Recovery	Water Recovery	Water & LNAPL Recovery	Water & LNAPL Recovery	Water Recovery	Water Recovery	Water Recovery	Water Recovery	Water Recovery	Water Recovery
Drilling & Lithologic Log Available (Y/N)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Drilling Method	Air Rotary w/mist	Air Rotary w/mist	Air Rotary w/mist	Air Rotary w/mist	Air Rotary w/mist	Air Rotary w/mist	Air Rotary w/mist	Air Rotary w/mist	Air Rotary w/mist	Air Rotary w/mist	Air Rotary w/mist
Data Drilled	Feb-84	Aug-92	Sep-93	Sep-93	Nov-93	Feb-94	Feb-94	Feb-94	Feb-94	Feb-94	Feb-94
Casing I.D. (in)	8.6	6.0	6.0	2.0	2.0	6.0	6.0	6.0	6.0	6.0	6.0
Casing Type/Materials	Steel	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC
How Joined?	Threaded Coupling	Threaded Coupling	Threaded Coupling	Flush-threaded joints	Flush-threaded joints	Threaded Coupling	Threaded Coupling	Threaded Coupling	Threaded Coupling	Threaded Coupling	Threaded Coupling
Stick-up Length (ft-above grade)	1.0	2.3	1.9	3.4	2.7	3.1	3.5	4.8	5.1	2.4	2.6
Top of Casing (ft-MSL)	2445.85	2442.67	2387.48	2464.75	2454.14	2388.84	2406.25	2436.69	2441.83	2440.68	2431.88
Ground Surface Elevation (ft-MSL)	2444.85	2440.41	2385.54	2461.35	2451.40	2385.79	2402.71	2431.86	2436.77	2438.26	2429.25
Capped/Lockable (Y/N)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Well Head Protection	Steel Slip-Over Plate	Steel Slip-Over Plate	Steel Slip-Over Plate	Locking Steel Case	Locking Steel Case	Steel Slip-Over Plate	Steel Slip-Over Plate	Steel Slip-Over Plate	Steel Slip-Over Plate	Steel Slip-Over Plate	Steel Slip-Over Plate
Surface Pad Size (ft)	6' x 6' x 6"	6' x 6' x 6"	6' x 6' x 6"	6' x 6' x 6"	6' x 6' x 6"	6' x 6' x 6"	6' x 6' x 6"	6' x 6' x 6"	6' x 6' x 6"	6' x 6' x 6"	6' x 6' x 6"
Detailed drawing of well (Y/N)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Depth to Top Surface Seal - Cement (ft)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Surface seal design & Construction Available (Y/N)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Well Development Procedure available (Y/N)	YES - Air Hammer & Lift	YES - Air Hammer & Lift	YES - Air Hammer & Lift	YES - Air Hammer & Lift	YES - Air Hammer & Lift	YES - Air Hammer & Lift	YES - Air Hammer & Lift	YES - Air Hammer & Lift	YES - Air Hammer & Lift	YES - Air Hammer & Lift	YES - Air Hammer & Lift
Annulus Fill	Bentonite	Bentonite	Bentonite	Bentonite	Bentonite	Bentonite	Bentonite	Bentonite	Bentonite	Bentonite	Bentonite
Depth to Annulus Seal (ft)	15.0	38.0	12.0	58.0	59.0	6.0	20.0	53.0	54.0	54.0	41.0
Depth to Filter Pack (ft)	40.0	42.0	16.0	65.0	63.0	8.0	22.0	55.0	56.0	56.0	43.0
Depth to 1st Saturated Zone (ft)	57.0	58.0	23.0	81.0	71.0	18.0	39.0	65.0	71.0	70.0	60.0
Length of Gravel Pack (ft)	65.0	43.0	29.0	31.0	43.0	34.0	39.0	35.0	39.0	41.0	44.0
Size of Gravel Pack	8-16 Sieve Silica Sand	8-16 Sieve Silica Sand	8-16 Sieve Silica Sand	8-16 Sieve Silica Sand	8-16 Sieve Silica Sand	8-16 Sieve Silica Sand	8-16 Sieve Silica Sand	8-16 Sieve Silica Sand	8-16 Sieve Silica Sand	8-16 Sieve Silica Sand	8-16 Sieve Silica Sand
Filter Pack Volume (# bags)	17	32	14	23	32	18	22	19	22	20	26

CP ATTACHMENT B - TABLE CP-B [2]

Table of Remediation Well Construction Details (Item 13)[C]

Well Number	P-3	RW-106	RW-112	DW-117	IW-127	RW-140	RW-141	RW-142	RW-143	RW-144	RW-145
Unit	CAS: Dual-Phase	CAS: Dual-Phase	CAS: South Boundary	CAS: Dual-Phase	CAS: Dual-Phase	CAS: South Boundary	CAS: South Boundary	CAS: South Boundary	CAS: South Boundary	CAS: South Boundary	CAS: South Boundary
Filter Pack Placement Method	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour
Depth to Top of Upper screen (ft)	49.0	50.0	20.0	76.0	66.0	12.0	31.0	60.0	65.0	62.0	57.0
Depth to Top of Lower screen (ft)	85.0	na	40.0	na	na	37.0	56.0	85.0	90.0	87.0	82.0
Sealant materials	Bentonite Pellets	Bentonite Pellets	Bentonite Pellets	Bentonite Pellets	Bentonite Pellets	Bentonite Pellets	Bentonite Pellets	Bentonite Pellets	Bentonite Pellets	Bentonite Pellets	Bentonite Pellets
Sealant Volume (# buckets)	22	4	4	6	4	2	2	2	2	2	2
Sealant placement method	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour
Sealant materials	Cement	Cement	Cement	Cement	Cement	Cement	Cement	Cement	Cement	Cement	Cement
Sealant Volume (# bags)	30	32	12	49	48	6	17	41	42	42	32
Sealant placement method	Trimie line Pump	Trimie line Pump	Trimie line Pump	Trimie line Pump	Trimie line Pump	Trimie line Pump	Trimie line Pump	Trimie line Pump	Trimie line Pump	Trimie line Pump	Trimie line Pump
Screen Slot Size (in)	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
Screen Type	Mill-Slotted PVC	Mill-Slotted PVC	Mill-Slotted PVC	Mill-Slotted PVC	Mill-Slotted PVC	Mill-Slotted PVC	Mill-Slotted PVC	Mill-Slotted PVC	Mill-Slotted PVC	Mill-Slotted PVC	Mill-Slotted PVC
Upper Screen Length (ft)	14.0	35.0	15.0	20.0	40.0	20.0	20.0	20.0	20.0	20.0	20.0
Lower Screen Length (ft)	20.0	na	5.0	na	na	5.0	5.0	5.0	5.0	10.0	5.0
Blank Length (ft)	22.0	na	5.0	na	na	5.0	5.0	5.0	5.0	5.0	5.0
Devalopment Method	Over Pump	Air-Lift Hammer, Pump	Air-Lift Hammer, Pump	Air-Lift Hammer, Pump	Air-Lift Hammer, Pump	Air-Lift Hammer, Pump	Air-Lift Hammer, Pump	Air-Lift Hammer, Pump	Air-Lift Hammer, Pump	Air-Lift Hammer, Pump	Air-Lift Hammer, Pump
Well Latitude Coordinate	32.2674	32.2650	32.2585	32.2659	32.2640	32.2588	32.2574	32.2581	32.2593	32.2599	32.2606
Well Longitude Coordinate	-101.4144	-101.4110	-101.4110	-101.4163	-101.4153	-101.4099	-101.4160	-101.4128	-101.4075	-101.4047	-101.4019

[A] - Map Panel of Well Location in Attachment CP-B [A]

[B] - See Attachment CP-B [C] for Remediation Well Construction & Lithologic Logs

CP ATTACHMENT B - TABLE CP-B [2]

Table of Remediation Well Construction Details (Item 13)[C]

Well Number	RW-146	RW-147	RW-170	RW-171	W-172	RW-173	RW-174	RW-175	RW-176R	RW-177	RW-178
Unit	CAS: South Boundary	CAS: South Boundary	CAS: South Boundary	CAS: Dual-Phase	CAS: Dual-Phase	CAS: Dual-Phase	CAS: Dual-Phase	CAS: Dual-Phase	CAS: Dual-Phase	CAS: Dual-Phase	CAS: Dual-Phase
Hole Diameter (in)	12.25	12.25	12.25	14	14	14	14	14	14	14	14
Well Diameter (in)	6.0	6.0	6.0	8.0	8.0	8.0	8.0	8.0	6.0	8.0	8.0
Total Borehole Depth (ft)	100.0	100.0	110.0	115.0	117.0	120.0	100.0	100.0	86.0	80.0	95.0
Constructed Well Depth (ft)	91.0	90.0	80.5	113.0	108.0	102.0	95.0	88.0	86.0	78.0	88.0
Well Location Available (Y/N)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Map Panel Located [A]	L	L	L	K2	K2	G	G	H	K	K	K
Intended Use of Well	Water Recovery	Water Recovery	Water Recovery	Water & LNAPL Recovery	Water & LNAPL Recovery	Water & LNAPL Recovery	Water & LNAPL Recovery	Water & LNAPL Recovery	Water & LNAPL Recovery	Water & LNAPL Recovery	Water & LNAPL Recovery
Drilling & Lithologic Log Available (Y/N)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Drilling Method	Air Rotary w/mist	Air Rotary w/mist	Air Rotary w/mist	Air Rotary w/mist	Air Rotary w/mist	Air Rotary w/mist	Air Rotary w/mist	Air Rotary w/mist	Air Rotary w/mist	Air Rotary w/mist	Air Rotary w/mist
Data Drilled	Feb-94	Feb-94	Aug-95	Sep-95	Sep-95	Sep-95	Sep-95	Sep-95	Nov-15	Sep-95	Sep-95
Casing I.D. (in)	6.0	6.0	6.0	8.0	8.0	8.0	8.0	8.0	6.0	8.0	8.0
Casing Type/Materials	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC
How Joined?	Threaded Coupling	Threaded Coupling	Threaded Coupling	Threaded Coupling	Threaded Coupling	Threaded Coupling	Threaded Coupling	Threaded Coupling	Threaded Coupling	Threaded Coupling	Threaded Coupling
Stick-up Length (ft-above grade)	3.6	3.1	2.0	1.3	1.2	1.0	1.0	1.1	1.5	1.3	1.5
Top of Casing (ft-MSL)	2441.48	2448.40	2435.15	2460.79	2461.24	2456.26	2454.49	2434.90	2443.66	2434.41	2437.65
Ground Surface Elevation (ft-MSL)	2437.86	2445.33	2433.15	2459.49	2460.05	2455.27	2453.46	2433.78	2441.60	2433.10	2436.18
Capped/Lockable (Y/N)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Well Head Protection	Steel Slip-Over Plate	Steel Slip-Over Plate	Steel Slip-Over Plate	Steel Slip-Over Plate	Steel Slip-Over Plate	Steel Slip-Over Plate	Steel Slip-Over Plate	Steel Slip-Over Plate	Steel Slip-Over Plate	Steel Slip-Over Plate	Steel Slip-Over Plate
Surface Pad Size (ft)	6' x 6' x 6"	6' x 6' x 6"	6' x 6' x 6"	6' x 6' x 6"	6' x 6' x 6"	6' x 6' x 6"	6' x 6' x 6"	6' x 6' x 6"	6' x 6' x 6"	6' x 6' x 6"	6' x 6' x 6"
Detailed drawing of well (Y/N)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Depth to Top Surface Seal - Cement (ft)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Surface seal design & Construction Available (Y/N)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Well Development Procedure available (Y/N)	YES - Air Hammer & Lift	YES - Air Hammer & Lift	YES - Air Hammer & Lift	YES - Air Hammer & Lift	YES - Air Hammer & Lift	YES - Air Hammer & Lift	YES - Air Hammer & Lift	YES - Air Hammer & Lift	YES - Air Hammer & Lift	YES - Air Hammer & Lift	YES - Air Hammer & Lift
Annulus Fill	Bentonite	Bentonite	Bentonite	Bentonite	Bentonite	Bentonite	Bentonite	Bentonite	Bentonite	Bentonite	Bentonite
Depth to Annulus Seal (ft)	55.0	61.0	53.0	60.5	64.0	48.0	62.0	40.0	2.0	40.0	39.0
Depth to Filter Pack (ft)	61.0	67.0	56.0	68.0	68.0	51.0	65.0	43.0	41.0	43.0	42.0
Depth to 1st Saturated Zone (ft)	68.0	79.0	66.0	78.0	78.0	70.0	75.0	53.0	63.0	53.0	53.0
Length of Gravel Pack (ft)	40.0	33.0	39.5	45.0	40.0	51.0	30.0	45.0	45.0	35.0	46.0
Size of Gravel Pack	8-16 Sieve Silica Sand	8-16 Sieve Silica Sand	8-16 Sieve Silica Sand	8-16 Sieve Silica Sand	8-16 Sieve Silica Sand	8-16 Sieve Silica Sand	8-16 Sieve Silica Sand	8-16 Sieve Silica Sand	8-16 Sieve Silica Sand	8-16 Sieve Silica Sand	8-16 Sieve Silica Sand
Filter Pack Volume (# bags)	23	17	18	34	30	38	23	34	34	26	35

CP ATTACHMENT B - TABLE CP-B [2]

Table of Remediation Well Construction Details (Item 13)[C]

Well Number	RW-146	RW-147	RW-170	RW-171	W-172	RW-173	RW-174	RW-175	RW-176R	RW-177	RW-178
Unit	CAS: South Boundary	CAS: South Boundary	CAS: South Boundary	CAS: Dual-Phase	CAS: Dual-Phase	CAS: Dual-Phase	CAS: Dual-Phase	CAS: Dual-Phase	CAS: Dual-Phase	CAS: Dual-Phase	CAS: Dual-Phase
~~Filter Pack Placement Method~~	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour
Depth to Top of Upper screen (ft)	66.0	70.0	60.5	73.0	73.0	62.0	70.0	48.0	46.0	48.0	48.0
Depth to Top of Lower screen (ft)	96.0	95.0	85.5	na	na	na	na	na	na	na	na
Sealant materials	Bentonite Pellets	Bentonite Pellets	Bentonite Pellets	Bentonite Pellets	Bentonite Pellets	Bentonite Pellets	Bentonite Pellets	Bentonite Pellets	Bentonite Pellets	Bentonite Pellets	Bentonite Pellets
Sealant Volume (# buckets)	5	5	3	7	4	3	3	3	34	3	3
Sealant placement method	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour
Sealant materials	Cement	Cement	Cement	Cement	Cement	Cement	Cement	Cement	Cement	Cement	Cement
Sealant Volume (# bags)	46	51	42	51	51	38	49	32	31	32	32
Sealant placement method	Trimie line Pump	Trimie line Pump	Trimie line Pump	Trimie line Pump	Trimie line Pump	Trimie line Pump	Trimie line Pump	Trimie line Pump	Trimie line Pump	Trimie line Pump	Trimie line Pump
Screen Slot Size (in)	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
Screen Type	Mill-Slotted PVC	Mill-Slotted PVC	Mill-Slotted PVC	Mill-Slotted PVC	Mill-Slotted PVC	Mill-Slotted PVC	Mill-Slotted PVC	Mill-Slotted PVC	Mill-Slotted PVC	Mill-Slotted PVC	Mill-Slotted PVC
Upper Screen Length (ft)	**25.0**	**20.0**	**20.0**	**40.0**	**35.0**	**40.0**	**25.0**	**40.0**	**40.0**	**30.0**	40.0
Lower Screen Length (ft)	**5.0**	**5.0**	**10.0**	na	na	na	na	na	na	na	na
Blank Length (ft)	5.0	5.0	5.0	na	na	na	na	na	na	na	na
Devalopment Method	Air-Lift Hammer, Pump	Air-Lift Hammer, Pump	Air-Lift Hammer, Pump	Air-Lift Hammer, Pump	Air-Lift Hammer, Pump	Air-Lift Hammer, Pump	Air-Lift Hammer, Pump	Air-Lift Hammer, Pump	Air-Lift Hammer, Pump	Air-Lift Hammer, Pump	Air-Lift Hammer, Pump
Well Latitude Coordinate	32.2625	32.2643	32.2616	32.2658	32.2659	32.2664	32.2664	32.2665	32.2662	32.2644	32.2660
Well Longitude Coordinate	-101.4023	-101.4029	-101.4021	-101.4173	-101.4159	-101.4119	-101.4109	-101.4095	-101.4134	-101.4110	-101.4147

[A] - Map Panel of Well Location in Attachment CP-B [A]

[B] - See Attachment CP-B [C] for Remediation Well Construction & Lithologic Logs

CP ATTACHMENT B - TABLE CP-B [2]

Table of Remediation Well Construction Details (Item 13)[C]

Well Number	RW-179	RW-192	RW-194	RW-195	RW-196	RW-197	RW-198	RW-199	RIW-200	RIW-201	RIW-202
Unit	CAS: Dual-Phase	CAS: Dual-Phase	CAS: South Boundary	CAS: South Boundary	CAS: South Boundary	CAS: South Boundary	CAS: South Boundary	CAS: South Boundary	CAS: Re-Injection	CAS: Re-Injection	CAS: Re-Injection
Hole Diameter (in)	14	14	8	8	8	12.25	12.25	12.25	12.25	12.25	12.25
Well Diameter (in)	8.0	8.0	6.0	6.0	6.0	6.0	6.0	6.0	8.0	8.0	8.0
Total Borehole Depth (ft)	80.0	110.0	120.0	100.0	120.0	100.0	100.0	95.0	120.0	120.0	100.0
Constructed Well Depth (ft)	73.0	106.0	90.5	85.0	93.0	62.0	75.0	67.0	103.0	104.0	91.0
Well Location Available (Y/N)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Map Panel Located [A]	H	K2	L	P	P	O	O	O	L	L	L
Intended Use of Well	Water & LNAPL Recovery	Water & LNAPL Recovery	Water Recovery	Water Recovery	Water Recovery	Water Recovery	Water Recovery	Water Recovery	Treated Water Injection	Treated Water Injection	Treated Water Injection
Drilling & Lithologic Log Available (Y/N)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Drilling Method	Air Rotary w/mist	Air Rotary w/mist	Air Rotary w/mist	Air Rotary w/mist	Air Rotary w/mist	Air Rotary w/mist	Air Rotary w/mist	Air Rotary w/mist	Air Rotary w/mist	Air Rotary w/mist	Air Rotary w/mist
Data Drilled	Oct-95	Oct-95	Oct-96	Oct-96	Oct-96	Oct-96	Oct-96	Oct-96	Oct-96	Oct-96	Oct-96
Casing I.D. (in)	8.0	8.0	6.0	6.0	6.0	6.0	6.0	6.0	8.0	8.0	8.0
Casing Type/Materials	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC	Stainless Steel	Stainless Steel	Stainless Steel
How Joined?	Threaded Coupling	Threaded Coupling	Threaded Coupling	Threaded Coupling	Threaded Coupling	Threaded Coupling	Threaded Coupling	Threaded Coupling	Threaded Coupling	Threaded Coupling	Threaded Coupling
Stick-up Length (ft-above grade)	1.3	1.1	0.4	2.2	2.7	1.9	2.3	20.6	2.5	2.6	2.8
Top of Casing (ft-MSL)	2434.75	2461.05	2441.86	2434.41	2440.73	2419.37	2433.13	2440.42	2448.24	2447.24	2434.77
Ground Surface Elevation (ft-MSL)	2433.50	2459.94	2441.50	2432.20	2438.00	2417.50	2430.80	2419.80	2445.69	2444.60	2432.00
Capped/Lockable (Y/N)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Well Head Protection	Steel Slip-Over Plate	Steel Slip-Over Plate	Steel Slip-Over Plate	Steel Slip-Over Plate	Steel Slip-Over Plate	Steel Slip-Over Plate	Steel Slip-Over Plate	Steel Slip-Over Plate	Steel Slip-Over Plate	Steel Slip-Over Plate	Steel Slip-Over Plate
Surface Pad Size (ft)	6' x 6' x 6"	6' x 6' x 6"	6' x 6' x 6"	6' x 6' x 6"	6' x 6' x 6"	6' x 6' x 6"	6' x 6' x 6"	6' x 6' x 6"	6' x 6' x 6"	6' x 6' x 6"	6' x 6' x 6"
Detailed drawing of well (Y/N)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Depth to Top Surface Seal - Cement (ft)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Surface seal design & Construction Available (Y/N)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Well Development Procedure available (Y/N)	YES - Air Hammer & Lift	YES - Air Hammer & Lift	YES - Air Hammer & Lift	YES - Air Hammer & Lift	YES - Air Hammer & Lift	YES - Air Hammer & Lift	YES - Air Hammer & Lift	YES - Air Hammer & Lift	YES - Air Hammer & Lift	YES - Air Hammer & Lift	YES - Air Hammer & Lift
Annulus Fill	Bentonite	Bentonite	Bentonite	Bentonite	Bentonite	Bentonite	Bentonite	Bentonite	Bentonite	Bentonite	Bentonite
Depth to Annulus Seal (ft)	33.0	57.0	51.5	45.0	54.0	36.0	54.0	32.0	44.5	54.0	41.0
Depth to Filter Pack (ft)	36.0	60.0	57.0	48.0	56.5	41.0	57.0	36.0	48.5	57.8	44.0
Depth to 1st Saturated Zone (ft)	48.0	73.0	67.0	63.0	68.0	52.0	68.0	60.0	67.0	69.0	57.0
Length of Gravel Pack (ft)	37.0	46.0	48.5	47.0	46.5	41.0	28.0	41.0	54.5	46.3	47.0
Size of Gravel Pack	8-16 Sieve Silica Sand	8-16 Sieve Silica Sand	8-16 Sieve Silica Sand	8-16 Sieve Silica Sand	8-16 Sieve Silica Sand	8-16 Sieve Silica Sand	8-16 Sieve Silica Sand	8-16 Sieve Silica Sand	8-16 Sieve Silica Sand	8-16 Sieve Silica Sand	8-16 Sieve Silica Sand
Filter Pack Volume (# bags)	28	35	25	28	28	16	14	23	41	35	35

CP ATTACHMENT B - TABLE CP-B [2]

Table of Remediation Well Construction Details (Item 13)[C]

Well Number	RW-179	RW-192	RW-194	RW-195	RW-196	RW-197	RW-198	RW-199	RIW-200	RIW-201	RIW-202
Unit	CAS: Dual-Phase	CAS: Dual-Phase	CAS: South Boundary	CAS: South Boundary	CAS: South Boundary	CAS: South Boundary	CAS: South Boundary	CAS: South Boundary	CAS: Re-Injection	CAS: Re-Injection	CAS: Re-Injection
~~Filter Pack Placement Method~~	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour
Depth to Top of Upper screen (ft)	43.0	66.0	60.5	55.0	63.0	47.0	65.0	47.0	57.0	63.5	50.5
Depth to Top of Lower screen (ft)	na	na	95.5	90.0	98.0	67.0	80.0	72.0	na	na	na
Sealant materials	Bentonite Pellets	Bentonite Pellets	Bentonite Pellets	Bentonite Pellets	Bentonite Pellets	Bentonite Pellets	Bentonite Pellets	Bentonite Pellets	Bentonite Pellets	Bentonite Pellets	Bentonite Pellets
Sealant Volume (# buckets)	3	3	5	3	2	4	3	4	4	3	3
Sealant placement method	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour
Sealant materials	Cement	Cement	Cement	Cement	Cement	Cement	Cement	Cement	Cement	Cement	Cement
Sealant Volume (# bags)	27	45	43	36	43	31	43	27	37	44	33
Sealant placement method	Trimie line Pump	Trimie line Pump	Trimie line Pump	Trimie line Pump	Trimie line Pump	Trimie line Pump	Trimie line Pump	Trimie line Pump	Trimie line Pump	Trimie line Pump	Trimie line Pump
Screen Slot Size (in)	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
Screen Type	Mill-Slotted PVC	Mill-Slotted PVC	Mill-Slotted PVC	Mill-Slotted PVC	Mill-Slotted PVC	Mill-Slotted PVC	Mill-Slotted PVC	Mill-Slotted PVC	Vee-Wire SS Screen	Vee-Wire SS Screen	Vee-Wire SS Screen
Upper Screen Length (ft)	**30.0**	**40.0**	**30.0**	**30.0**	**30.0**	**15.0**	**10.0**	**20.0**	**46.0**	**40.5**	40.5
Lower Screen Length (ft)	**na**	na	**10.0**	**5.0**	**5.0**	**15.0**	**5.0**	**5.0**	na	na	na
Blank Length (ft)	na	na	5.0	5.0	5.0	5.0	5.0	5.0	na	na	na
Devalopment Method	Air-Lift Hammer, Pump	Air-Lift Hammer, Pump	Air-Lift Hammer, Pump	Air-Lift Hammer, Pump	Air-Lift Hammer, Pump	Air-Lift Hammer, Pump	Air-Lift Hammer, Pump	Air-Lift Hammer, Pump	Air-Lift Hammer, Pump	Air-Lift Hammer, Pump	Air-Lift Hammer, Pump
Well Latitude Coordinate	32.2665	32.2659	32.2635	32.2604	32.2598	32.2591	32.2577	32.2584	32.2648	32.2638	32.2634
Well Longitude Coordinate	-101.4083	-101.4158	-101.4026	-101.4030	-101.4060	-101.4086	-101.4147	-101.4120	-101.4056	-101.4052	-101.4068

[A] - Map Panel of Well Location in Attachment CP-B [A]

[B] - See Attachment CP-B [C] for Remediation Well Construction & Lithologic Logs

CP ATTACHMENT B - TABLE CP-B [2]

Table of Remediation Well Construction Details (Item 13)[C]

Well Number	RIW-203	RIW-204	RIW-205R	RIW-206	RIW-207	RIW-208	RIW-209	RIW-210	RIW-211	RIW-212	RIW-213
Unit	CAS: Re-Injection	CAS: Re-Injection	CAS: Re-Injection	CAS: Re-Injection	CAS: Re-Injection	CAS: Re-Injection	CAS: Re-Injection	CAS: Re-Injection	CAS: Re-Injection	CAS: Re-Injection	CAS: Re-Injection
Hole Diameter (in)	12.25	12.25	12.25	12.25	12.25	12.25	12.25	12.25	12.25	12.25	12.25
Well Diameter (in)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Total Borehole Depth (ft)	100.0	80.0	80.0	95.0	80.0	80.0	100.0	90.0	120.0	120.0	120.0
Constructed Well Depth (ft)	90.0	70.0	68.0	79.0	72.0	69.0	85.0	78.0	100.0	108.0	110.0
Well Location Available (Y/N)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Map Panel Located [A]	L	K	K	K	K	K	K	K	K	K	K
Intended Use of Well	Treated Water Injection	Treated Water Injection	Treated Water Injection	Treated Water Injection	Treated Water Injection	Treated Water Injection	Treated Water Injection	Treated Water Injection	Treated Water Injection	Treated Water Injection	Treated Water Injection
Drilling & Lithologic Log Available (Y/N)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Drilling Method	Air Rotary w/mist	Air Rotary w/mist	Air Rotary w/mist	Air Rotary w/mist	Air Rotary w/mist	Air Rotary w/mist	Air Rotary w/mist	Air Rotary w/mist	Air Rotary w/mist	Air Rotary w/mist	Air Rotary w/mist
Data Drilled	Oct-96	Oct-96	Jul-00	Oct-96	Oct-96	Oct-96	Oct-96	Oct-96	Oct-96	Oct-96	Oct-96
Casing I.D. (in)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Casing Type/Materials	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel
How Joined?	Threaded Coupling	Threaded Coupling	Threaded Coupling	Threaded Coupling	Threaded Coupling	Threaded Coupling	Threaded Coupling	Threaded Coupling	Threaded Coupling	Threaded Coupling	Threaded Coupling
Stick-up Length (ft-above grade)	3.3	2.9	2.7	2.9	3.0	3.2	3.4	2.4	2.6	3.0	3.0
Top of Casing (ft-MSL)	2436.06	2415.22	2414.37	2421.96	2419.57	2415.74	2428.66	2422.86	2448.11	2453.89	2456.26
Ground Surface Elevation (ft-MSL)	2432.80	2412.30	2411.70	2419.10	2416.60	2412.50	2425.30	2420.50	2445.50	2450.90	2453.30
Capped/Lockable (Y/N)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Well Head Protection	Steel Slip-Over Plate	Steel Slip-Over Plate	Steel Slip-Over Plate	Steel Slip-Over Plate	Steel Slip-Over Plate	Steel Slip-Over Plate	Steel Slip-Over Plate	Steel Slip-Over Plate	Steel Slip-Over Plate	Steel Slip-Over Plate	Steel Slip-Over Plate
Surface Pad Size (ft)	6' x 6' x 6"	6' x 6' x 6"	6' x 6' x 6"	6' x 6' x 6"	6' x 6' x 6"	6' x 6' x 6"	6' x 6' x 6"	6' x 6' x 6"	6' x 6' x 6"	6' x 6' x 6"	6' x 6' x 6"
Detailed drawing of well (Y/N)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Depth to Top Surface Seal - Cement (ft)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Surface seal design & Construction Available (Y/N)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Well Development Procedure available (Y/N)	YES - Air Hammer & Lift	YES - Air Hammer & Lift	YES - Air Hammer & Lift	YES - Air Hammer & Lift	YES - Air Hammer & Lift	YES - Air Hammer & Lift	YES - Air Hammer & Lift	YES - Air Hammer & Lift	YES - Air Hammer & Lift	YES - Air Hammer & Lift	YES - Air Hammer & Lift
Annulus Fill	Bentonite	Bentonite	Bentonite	Bentonite	Bentonite	Bentonite	Bentonite	Bentonite	Bentonite	Bentonite	Bentonite
Depth to Annulus Seal (ft)	34.0	21.0	14.0	22.0	22.5	14.5	31.0	28.0	44.0	50.5	60.0
Depth to Filter Pack (ft)	37.0	24.0	17.0	27.0	26.0	18.0	34.0	31.0	47.0	54.0	63.0
Depth to 1st Saturated Zone (ft)	52.0	36.0	29.0	39.0	39.0	33.0	48.0	44.0	69.0	72.0	76.0
Length of Gravel Pack (ft)	53.0	46.0	51.0	52.0	46.0	51.0	51.0	47.0	53.0	54.0	47.0
Size of Gravel Pack	8-16 Sieve Silica Sand	8-16 Sieve Silica Sand	8-16 Sieve Silica Sand	8-16 Sieve Silica Sand	8-16 Sieve Silica Sand	8-16 Sieve Silica Sand	8-16 Sieve Silica Sand	8-16 Sieve Silica Sand	8-16 Sieve Silica Sand	8-16 Sieve Silica Sand	8-16 Sieve Silica Sand
Filter Pack Volume (# bags)	40	35	38	39	35	38	38	35	40	41	35

CP ATTACHMENT B - TABLE CP-B [2]

Table of Remediation Well Construction Details (Item 13)[C]

Well Number	RIW-203	RIW-204	RIW-205R	RIW-206	RIW-207	RIW-208	RIW-209	RIW-210	RIW-211	RIW-212	RIW-213
Unit	CAS: Re-Injection	CAS: Re-Injection	CAS: Re-Injection	CAS: Re-Injection	CAS: Re-Injection	CAS: Re-Injection	CAS: Re-Injection	CAS: Re-Injection	CAS: Re-Injection	CAS: Re-Injection	CAS: Re-Injection
Filter Pack Placement Method	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour
Depth to Top of Upper screen (ft)	44.0	29.5	22.0	33.0	31.5	23.0	39.0	36.5	59.0	46.5	69.0
Depth to Top of Lower screen (ft)	na	na	na	na	na	na	na	na	na	na	na
Sealant materials	Bentonite Pellets	Bentonite Pellets	Bentonite Pellets	Bentonite Pellets	Bentonite Pellets	Bentonite Pellets	Bentonite Pellets	Bentonite Pellets	Bentonite Pellets	Bentonite Pellets	Bentonite Pellets
Sealant Volume (# buckets)	3	3	3	4	3	3	3	3	3	3	3
Sealant placement method	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour	Trimie pipe pour
Sealant materials	Cement	Cement	Cement	Cement	Cement	Cement	Cement	Cement	Cement	Cement	Cement
Sealant Volume (# bags)	28	18	13	20	20	14	26	23	35	41	48
Sealant placement method	Trimie line Pump	Trimie line Pump	Trimie line Pump	Trimie line Pump	Trimie line Pump	Trimie line Pump	Trimie line Pump	Trimie line Pump	Trimie line Pump	Trimie line Pump	Trimie line Pump
Screen Slot Size (in)	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
Screen Type	Vee-Wire SS Screen	Vee-Wire SS Screen	Vee-Wire SS Screen	Vee-Wire SS Screen	Vee-Wire SS Screen	Vee-Wire SS Screen	Vee-Wire SS Screen	Vee-Wire SS Screen	Vee-Wire SS Screen	Vee-Wire SS Screen	Vee-Wire SS Screen
Upper Screen Length (ft)	**46.0**	**40.5**	**46.0**	**46.0**	**40.5**	**46.0**	**46.0**	**41.5**	**41.0**	**61.5**	**41.0**
Lower Screen Length (ft)	**na**	na	na	na	na	na	na	na	na	na	na
Blank Length (ft)	na	na	na	na	na	na	na	na	na	na	na
Devalopment Method	Air-Lift Hammer, Pump	Air-Lift Hammer, Pump	Air-Lift Hammer, Pump	Air-Lift Hammer, Pump	Air-Lift Hammer, Pump	Air-Lift Hammer, Pump	Air-Lift Hammer, Pump	Air-Lift Hammer, Pump	Air-Lift Hammer, Pump	Air-Lift Hammer, Pump	Air-Lift Hammer, Pump
Well Latitude Coordinate	32.2647	32.2630	32.2643	32.2640	32.2639	32.2637	32.2633	32.2624	32.2619	32.2630	32.2625
Well Longitude Coordinate	-101.4073	-101.4083	-101.4088	-101.4105	-101.4113	-101.4121	-101.4137	-101.4123	-101.4138	-101.4152	-101.4168

[A] - Map Panel of Well Location in Attachment CP-B [A]

[B] - See Attachment CP-B [C] for Remediation Well Construction & Lithologic Logs

Well	Panel	Well Purpose	Program
P-3	G	Remediation	Dual-Phase
MW-38 & 38A	D	Monitoring	Site E
MW-39 & 39A	G	Monitoring	Site E
MW-40 & 40A	G	Monitoring	Site E
MW-41 & 41A	G	Monitoring	Site E
MW-52 & 52A	B	Monitoring	BICA/Site H
MW-53 & 53A	B	Monitoring	Site H
MW-54 & 54A	B	Monitoring	Site H
MW-74 & 74A	B	Monitoring	Site H
MW-75 & 75A	B	Monitoring	Site H
MW-76 & 76A	B	Monitoring	BICA/Site H
MW-77 & 77A	B	Monitoring	Site H
MW-78 & 78A	O	Monitoring	BICA
MW-79 & 79A	O	Monitoring	BICA
MW-80 & 80A	K	Monitoring	BICA
MW-80 & 80A	K	Monitoring	BICA
RW-106	K	Remediation	Dual-Phase
MW-109 & 109A	O	Monitoring	BICA
RW-112	O	Remediation	S. Boundary
DW-117	K2	Remediation	Dual-Phase
MW-125 & 125A	J	Monitoring	BICA
IW-127	K2	Remediation	Dual-Phase
RW-140	O	Remediation	S. Boundary
RW-141	O	Remediation	S. Boundary
RW-142	O	Remediation	S. Boundary
RW-143	O	Remediation	S. Boundary
RW-144	P	Remediation	S. Boundary
RW-145	P	Remediation	S. Boundary
RW-146	L	Remediation	S. Boundary
RW-147	L	Remediation	S. Boundary
IW-149 & 149A	L	Monitoring	BICA
IW-150 &150A	P	Monitoring	BICA
MW-152 & 152A	F	Monitoring	BICA
MW-153 & 153A	F	Monitoring	BICA
MW-154 & 154A	J	Monitoring	BICA
MW-155 & 155A	I	Monitoring	BICA
RW-170	L	Remediation	S. Boundary
RW-171	K2	Remediation	Dual-Phase
W-172	K2	Remediation	Dual-Phase
RW-173	G	Remediation	Dual-Phase

Well	Panel	Well Purpose	Program
RW-174	G	Remediation	Dual-Phase
RW-175	H	Remediation	Dual-Phase
RW-176R	K	Remediation	Dual-Phase
RW-177	K	Remediation	Dual-Phase
RW-178	K	Remediation	Dual-Phase
RW-179	H	Remediation	Dual-Phase
MW-163/163A	J	Monitoring	BICA
RW-192	K2	Remediation	Dual-Phase
MW-165R/165AR	M	Monitoring	BICA
RW-194	L	Remediation	S. Boundary
MW-166/166A	M	Monitoring	BICA
RW-195	P	Remediation	S. Boundary
RW-196	P	Remediation	S. Boundary
RW-197	O	Remediation	S. Boundary
RW-198	O	Remediation	S. Boundary
RW-199	O	Remediation	S. Boundary
RIW-200	L	Remediation	Reinjection
RIW-201	L	Remediation	Reinjection
RIW-202	L	Remediation	Reinjection
RIW-203	L	Remediation	Reinjection
RIW-204	K	Remediation	Reinjection
RIW-205R	K	Remediation	Reinjection
RIW-206	K	Remediation	Reinjection
RIW-207	K	Remediation	Reinjection
RIW-208	K	Remediation	Reinjection
RIW-209	K	Remediation	Reinjection
RIW-210	K	Remediation	Reinjection
RIW-211	K	Remediation	Reinjection
RIW-212	K	Remediation	Reinjection
RIW-213	K	Remediation	Reinjection
MW-214 & 214A	E	Monitoring	BICA
RW-185	H	Remediation	Dual-Phase
MW-218 & 218A	H	Monitoring	BICA
MW-220 & 220A	D	Monitoring	BICA
MW-221 & 221A	D	Monitoring	BICA
MW-223 & 223A	B	Monitoring	BICA
MW-224 & 224A	B	Monitoring	BICA
MW-225 & 225A	C	Monitoring	BICA
MW-227 & 227A	C	Monitoring	BICA

INDEX TO ORTHOGRAPHIC MAPS OF WELL LOCATIONS

WELL MAP SYMBOLS

MONITORING WELLS

REMEDIATION WELLS

Monitor Well Installation

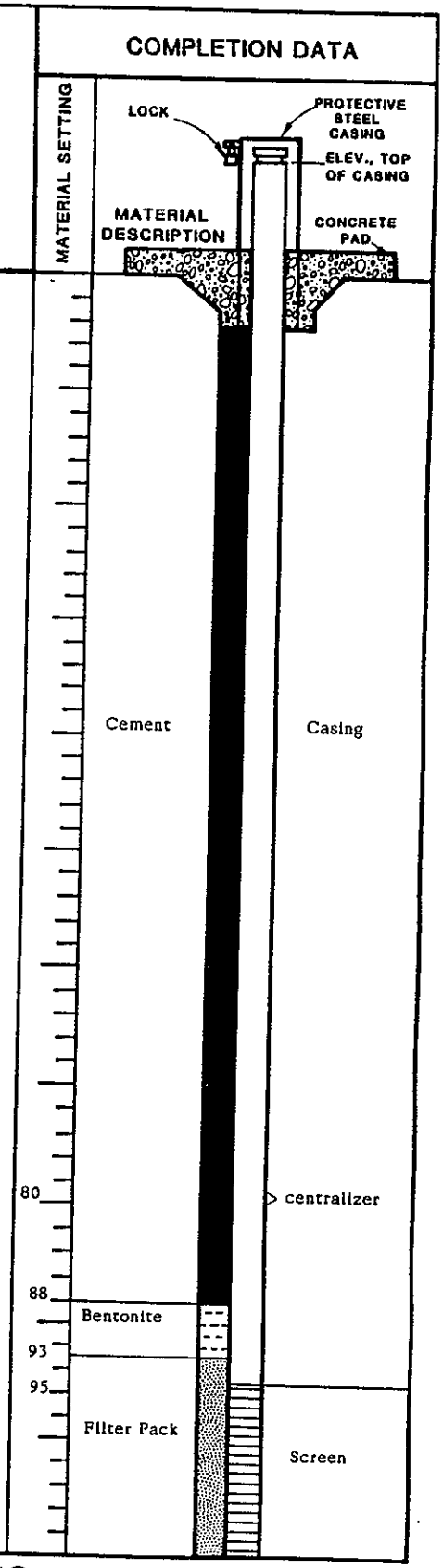
CLIENT: Fina Oil and Chemical Company JOB NO.: 119505 DATE DRILLED: 9-17-87 WELL NO.: MW-38

SITE: Big Spring, Texas ELEVATION: PAD 2497.45 TOP OF PVC CASING 2500.28

TOTAL DEPTH: 117.7' TOC CASING SIZE & TYPE: 2" PVC Flush Threaded SCREEN SIZE: 0.020 mill slot

WATER LEVEL: 100.21' REF.: TOC DATE: 10-1-87 TIME: 1417 Hrs. GEOLOGIST: Robert Sherrill

DEPTH	N. VALUE (BLOW/FT)	POCKET PENETROMETER (TONS/FT²)	SYMBOL	STRATIGRAPHY	SAMPLE DESCRIPTION
			SP		SAND - uniform fine grain, loose, grey, damp
10			SP		SAND - similar to above
20			SP		SAND - uniform fine grain, loose, red, dry
30			SP		SAND - similar to above except some minor gravel, calcareous
40			SP		SAND - similar to above except no gravel
50			SP		SAND - similar to above except 2% fine calcareous gravel
60			SP		SAND - similar to above
70			SP		SAND - similar to above
80			SP		SAND - similar to above except no gravel
90			SP		SAND - similar to above
					▼ Top of saturation 96' below grade
100			SP		SAND - similar to above except saturated



JONES AND NEUSE, INC.
Engineering and Environmental Consultants

Monitor Well Installation

CLIENT: Fina Oil and Chemical Company JOB NO.: 119505 DATE DRILLED: 9-17-87 WELL NO.: MW-38

SITE: Big Spring, Texas ELEVATION: PAD 2497.45 TOP OF PVC CASING 2500.28

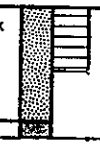
TOTAL DEPTH: 117.7' TOC CASING SIZE & TYPE: 2" PVC Flush Threaded SCREEN SIZE: 0.020 mill slot

WATER LEVEL: 100.21' REF.: TOC DATE: 10/1/87 TIME: 1417 hours GEOLOGIST: Robert Sherrill

DEPTH	N. VALUE (BLOW/FT)	POCKET PENETROMETER (TONS/FT²)	SYMBOL	STRATIGRAPHY	SAMPLE DESCRIPTION
			GP		SANDY GRAVEL - fine to very fine calcareous and chert gravel, subrounded,30% fine sand,loose,grey,saturated
120			GP		SANDY GRAVEL - similar to above except 45% sand
					Boring Terminated at 120' feet below grade

COMPLETION DATA

MATERIAL SETTING	MATERIAL DESCRIPTION CONT'D.
115	Filter Pack
119	Screen
120	Collapse



JONES AND NEUSE, INC. CONSULTING ENGINEERS' AUSTIN, TEXAS

Monitor Well Installation

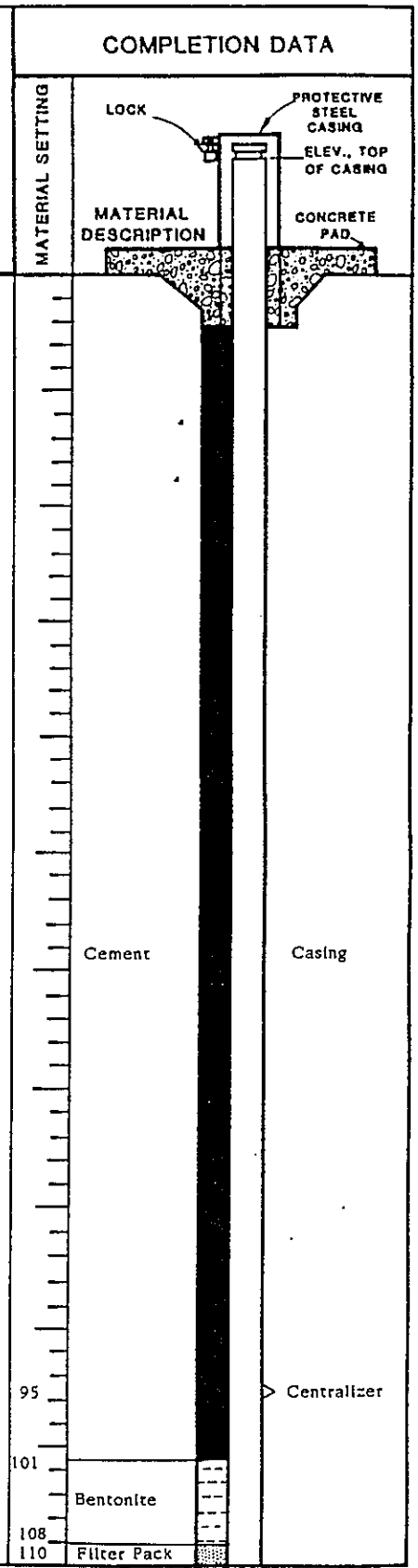
CLIENT: Fina Oil and Chemical Company JOB NO.: 119505 DATE DRILLED: 9-16-87 WELL NO.: MW-38A

SITE: Big Spring, Texas ELEVATION: PAD 2497.58 TOP OF PVC CASING 2500.25

TOTAL DEPTH: 147.77' TOC CASING SIZE & TYPE: 2" PVC Flush Threaded SCREEN SIZE: 0.020 mill slot

WATER LEVEL: 100.29' REF.: TOC DATE: 10-1-87 TIME: 1421 hrs. GEOLOGIST: Robert Sherrill

DEPTH	N. VALUE (BLOW/FT)	POCKET PENETROMETER (TONS/FT²)	SYMBOL	STRATIGRAPHY	SAMPLE DESCRIPTION
			SP		SAND - uniform fine grain, loose, black, saturated.
10			SP		SAND - similar to above
20			SP		SAND - uniform fine grain, loose, grey, damp
30			SP		SAND - similar to above except red, some minor calcareous gravel, dry
40			SP		SAND - uniform fine, loose, red, dry
50			SP		SAND - similar to above except 2% fine calcareous gravel
60			SP		SAND - similar to above
70			SP		SAND - similar to above
80			SP		SAND - similar to above except no gravel
90			SP		SAND - similar to above
			▼		Top of saturation 96' feet below grade
100			SP		SAND - similar to above except saturated



JONES AND NEUSE, INC.
Engineering and Environmental

Monitor Well Installation

CLIENT: Fina Oil and Chemical Company JOB NO.: 119505 DATE DRILLED: 3-16-87 WELL NO.: MW-38A

SITE: Big Spring, Texas ELEVATION: PAD 2497.58 TOP OF PVC CASING 2500.25

TOTAL DEPTH: 147.77' TOC CASING SIZE & TYPE: 2" ID PVC Flush Threaded SCREEN SIZE: 0.020 mill slot

WATER LEVEL: 100.29 REF.: TOC DATE: 10/1/87 TIME: 1421 hrs. GEOLOGIST: Robert L. Sherrill

DEPTH	N. VALUE (BLOW/FT)	POCKET PENETROMETER (TONS/FT²)	SYMBOL	STRATIGRAPHY	SAMPLE DESCRIPTION
120			GP		SANDY GRAVEL - fine to very fine calcareous and chert gravel, subrounded, 30% fine sand, loose, grey, saturated
			GP		SANDY GRAVEL - similar to above except 45% sand
130			GP		SANDY GRAVEL - similar to above except 10% sand
140			GP		SANDY GRAVEL - similar to above
					Ogallala FM / Dockum Group
150			CH		CLAY - highly plastic, dense, red, dry
160			CH		CLAY - similar to above
					Boring Terminated at 160' feet below grade
170					
180					
190					
200					
210					

COMPLETION DATA

MATERIAL SETTING	MATERIAL DESCRIPTION CONT'D.
145	Filter Pack
146	Collapse
160	

Screen

JONES AND NEUSE, INC. CONSULTING ENGINEERS AUSTIN, TEXAS

Monitor Well Installation

CLIENT: Fina Oil and Chemical Company JOB NO.: 119505 DATE DRILLED: 9-23-87 WELL NO.: MW-39

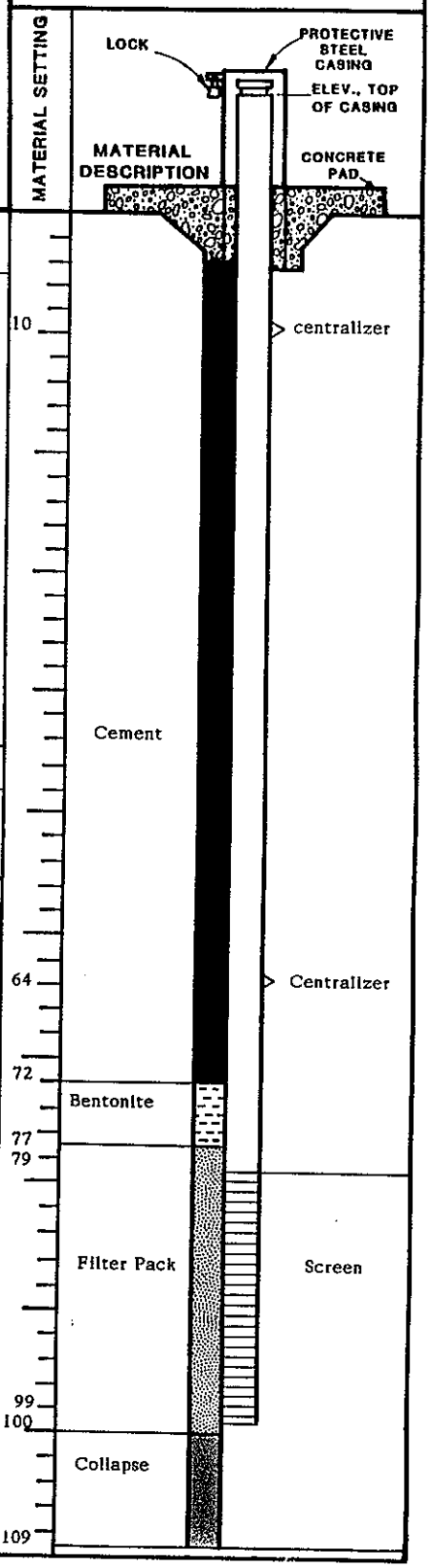
SITE: Big Spring, Texas ELEVATION: PAD 2482.59 TOP OF PVC CASING 2485.47

TOTAL DEPTH: 102.18' TOC CASING SIZE & TYPE: 2" PVC Flush Threaded SCREEN SIZE: 0.020 mill slot

WATER LEVEL: 87.32 REF.: TOC DATE: 10-1-87 TIME: 1430 hrs. GEOLOGIST: Robert L. Sherrill

DEPTH	N. VALUE (BLOW/FT)	POCKET PENETROMETER (TONS/FT²)	SYMBOL	STRATIGRAPHY	SAMPLE DESCRIPTION
					Asphalt
			F		Fill Material - SAND - uniform fine, loose, red, damp
10			SP		SAND - uniform fine grain, loose, red and grey, damp
20			SP		SAND - uniform fine grain, loose, red, dry, some minor very fine calcareous gravel
30			SP		SAND - uniform fine grain, loose, red, dry
40			SP		SAND - similar to above except some minor calcareous cement
			SS		SANDSTONE - uniform fine grain, dense, 40% calcareous cement, red, dry
50			SP		SAND - uniform fine grain, loose, red, dry
			SS		SANDSTONE - uniform fine grain, dense, 40% calcareous cement, red dry
60			SP		SAND - uniform fine grain, loose, red, dry
70			SP		SAND - similar to above
80			SP		▼ Top of Saturation 80 feet below grade SAND - uniform fine grain, <5% fine to medium calcareous and chert gravel, loose, red, saturated
90			SP		GRAVELLY SAND - uniform fine sand, 10% fine subrounded calcareous and chert gravel, loose, red, saturated
100			GP		GRAVEL - fine to medium chert and calcareous gravel, <5% fine sand, loose, red and grey, saturated
					BORING TERMINATED AT 109.0' BELOW GRADE

COMPLETION DATA



JONES AND NEUSE, INC.
Engineering and Environmental Consultants

Monitor Well Installation

CLIENT: Fina Oil and Chemical Company JOB NO.: 119505 DATE DRILLED: 9/22/87 WELL NO.: MW-39A

SITE: Big Spring, Texas ELEVATION: PAD 2482.88 TOP OF PVC CASING 2485.63

TOTAL DEPTH: 133.08' TOC CASING SIZE & TYPE: 2" ID PVC Flush Threaded SCREEN SIZE: 0.020 mill slot

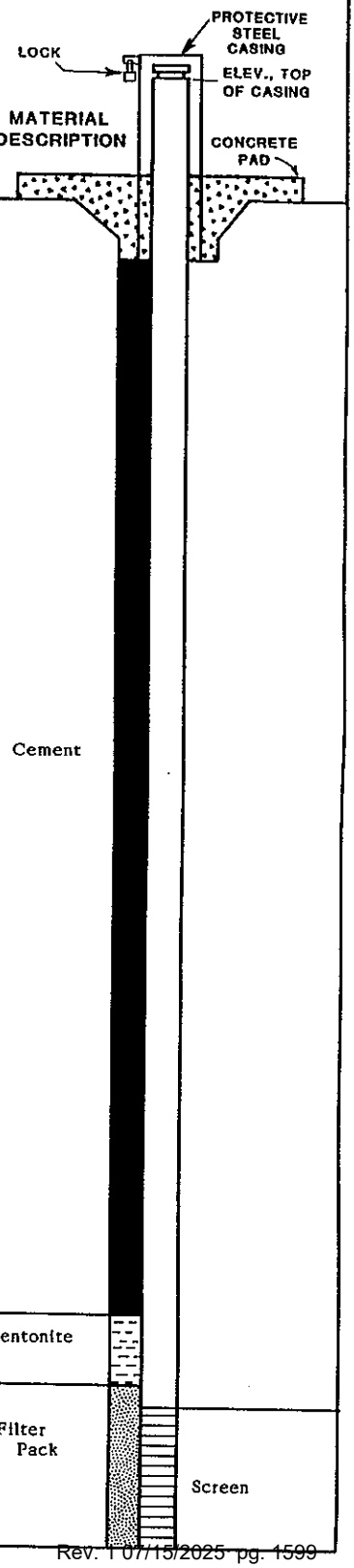
WATER LEVEL: 87.50' REF.: TOC DATE: 10-1-87 TIME: 1434 hrs. GEOLOGIST: Robert L. Sherrill

DEPTH	N. VALUE (BLOW/FT)	POCKET PENETROMETER (TONS/FT²)	SYMBOL	STRATIGRAPHY	SAMPLE DESCRIPTION
			F		Asphalt FILL MATERIAL - SAND - uniform fine, loose, red, damp
10			SP		SAND - uniform fine grain, loose, red and grey, damp
20			SP		SAND - uniform fine grain, loose, red, dry, some minor very fine calcareous gravel
30			SP		SAND - uniform fine grain, loose, red, dry
40			SP		SAND - similar to above except some minor calcareous cement
			SS		SANDSTONE - uniform fine grain, dense, 40% calcareous cement, red, dry
50			SP		SAND - uniform fine grain, loose, red, dry
			SS		SANDSTONE - uniform fine grain, dense, 40% calcareous cement, red, dry
60			SP		SAND - uniform fine grain, loose, red, dry
70			SP		SAND - uniform fine grain, loose, red, dry
					Top of Saturation 80.0' below grade
80			SP		SAND - uniform fine grain, <5% fine to medium calcareous and chert gravel, loose, red, saturated
90			SP		GRAVELLY SAND - uniform fine sand, 10% fine subrounded calcareous and chert gravel, loose, red, saturated
100			GP		GRAVEL - fine to medium chert and clacareous gravel, <5% fine sand, loose, red and grey, saturated

COMPLETION DATA

MATERIAL SETTING

MATERIAL DESCRIPTION



JONES AND NEUSE, INC. CONSULTING ENGINEERS AUSTIN, TEXAS

Monitor Well Installation

CLIENT: Fina Oil and Chemical Company JOB NO.: 119505 DATE DRILLED: 9-22-87 WELL NO.: MW-39A

SITE: Big Spring, Texas ELEVATION: PAD 2482.88 TOP OF PVC CASING 2485.63

TOTAL DEPTH: 133.08' TOC CASING SIZE & TYPE: 2" ID PVC Flush Threaded SCREEN SIZE: 0.020 mill slot

WATER LEVEL: 87.50 REF.: TOC DATE: 10/1/87 TIME: 1434 Hrs. GEOLOGIST: Robert L. Sherrill

DEPTH	N. VALUE (BLOW/FT)	POCKET PENETROMETER (TONS/FT²)	SYMBOL	STRATIGRAPHY	SAMPLE DESCRIPTION
120			GP		SANDY GRAVEL - similar to above except 15% fine sand
			GP		SANDY GRAVEL - similar to above
130			CH		CLAY - highly plastic, hard, dry, red — Ogallala FM / Dockum Group
140			CH		CLAY - similar to above
					Boring Terminated at 140 feet below grade

COMPLETION DATA

MATERIAL SETTING	MATERIAL DESCRIPTION CONT'D.
130	Filter Pack
132	Collapse
140	

JONES AND NEUSE, INC. CONSULTING ENGINEERS AUSTIN, TEXAS

Monitor Well Installation

CLIENT: Fina Oil and Chemical Company JOB NO.: 119505 DATE DRILLED: 9-10-87 WELL NO.: MW-40

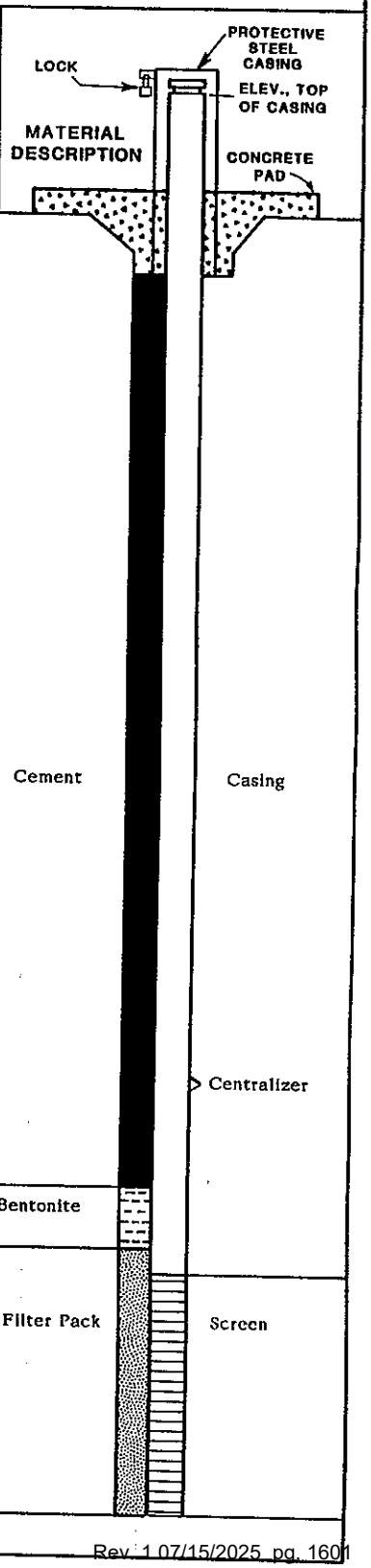
SITE: Big Spring, Texas ELEVATION: PAD 2477.28 TOP OF PVC CASING 2480.01

TOTAL DEPTH: 109.89' TOC CASING SIZE & TYPE: 2" Sch 40 PVC FLUSH THREADED SCREEN SIZE: 0.020 mill slot

WATER LEVEL: 83.55' REF.: TOC DATE: 10-1-87 TIME: 1450 hrs. GEOLOGIST: Robert L. Sherrill

DEPTH	N. VALUE (BLOW/FT)	POCKET PENETROMETER (TONS/FT²)	SYMBOL	STRATIGRAPHY	SAMPLE DESCRIPTION
10			SM		SILTY SAND - uniform medium sand, 10% silt, compact, red, dry
20			SP		SAND - uniform fine, loose, red, dry
30			SP		SAND - similar to above
40			SP		SAND - similar to above
50			SP		SAND - uniform fine, dense, 15% calcareous cement, light, red, dry
60			SP		SAND - similar to above
70			SP		SAND - similar to above
80			SP		SAND - similar to above except very dense
					Top of Saturation 88.0' below grade
90			SP		SAND - uniform fine, loose, red, saturated, <5% very fine caliche gravel
100			SP		SAND - uniform fine, loose, red, saturated
					BORING TERMINATED AT 107 FEET BELOW GRADE

COMPLETION DATA



JONES AND NEUSE, INC. CONSULTING ENGINEERS AUSTIN, TEXAS

Monitor Well Installation

CLIENT: Fina Oil and Chemical Company JOB NO.: 119505 DATE DRILLED: 9/8/87 WELL NO.: MW-40A

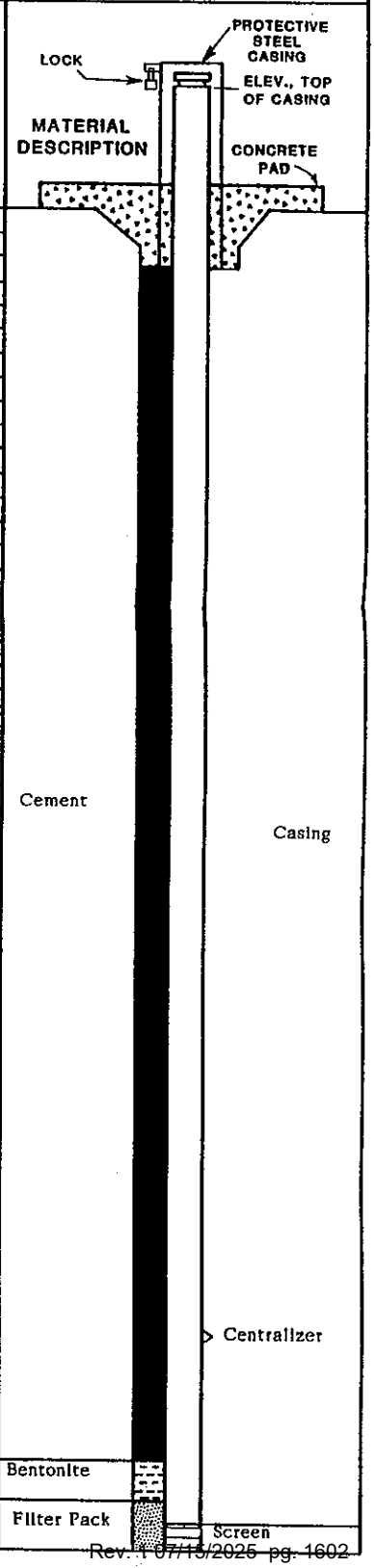
SITE: Big Spring, Texas ELEVATION: PAD 2477.32 TOP OF PVC CASING 2479.42

TOTAL DEPTH: 130.13' TOC CASING SIZE & TYPE: 2" Sch 40 PVC FLUSH THREADED SCREEN SIZE: 0.020 mill slot

WATER LEVEL: 83.64' REF.: TOC DATE: 10-1-87 TIME: 1454 hrs. GEOLOGIST: Robert Sherrill

DEPTH	N. VALUE (BLOW/FT)	POCKET PENETROMETER (TONS/FT²)	SYMBOL	STRATIGRAPHY	SAMPLE DESCRIPTION
10			SM		SILTY SAND - uniform medium sand, 10% silt, compact, red, dry
20			SP		SAND - uniform fine, loose, red, dry
30			SP		SAND - similar to above
40			SP		SAND - similar to above
50			SP		SAND - uniform fine, dense, 15% calcareous cement, light red, dry
60			SP		SAND - similar to above
70			SP		SAND - similar to above
80			SP		SAND - similar to above
					▼ Top of Saturation 88.0' BELOW GRADE
90			SP		SAND - uniform fine, loose, red, saturated, <5% very fine caliche gravel
100			SP		SAND - uniform fine, loose, red, saturated
			GP		SANDY GRAVEL

COMPLETION DATA



JONES AND NEUSE, INC. CONSULTING ENGINEERS' AUSTIN, TEXAS

Monitor Well Installation

CLIENT: Fina Oil and Chemical Company JOB NO.: 119505 DATE DRILLED: 9-8-87 WELL NO.: MW-40A

SITE: Big Spring, Texas ELEVATION: PAD 2477.32 TOP OF PVC CASING 2479.42

TOTAL DEPTH: 130.13' TOC CASING SIZE & TYPE: 2" Sch 40 PVC FLUSH THREADED SCREEN SIZE: 0.020 mill slot

WATER LEVEL: 83.64' REF.: TOC DATE: 10-1-87 TIME: 1454 hrs. GEOLOGIST: Robert L. Sherrill

DEPTH	N. VALUE (BLOW/FT)	POCKET PENETROMETER (TONS/FT²)	SYMBOL	STRATIGRAPHY	SAMPLE DESCRIPTION
			GP		SANDY GRAVEL - uniform fine chert and calcareous gravel, loose, red, saturated
120			GP		SANDY GRAVEL - similar to above
			CH		CLAY - highly plastic, hard, red, damp — Ogallala FM / Dockum Group
130					Boring Terminated at 130 feet below grade

COMPLETION DATA

MATERIAL SETTING	MATERIAL DESCRIPTION CONT'D.
128	Filter Sand / Screen
130	

JONES AND NEUSE, INC. CONSULTING ENGINEERS' AUSTIN, TEXAS

Monitor Well Installation

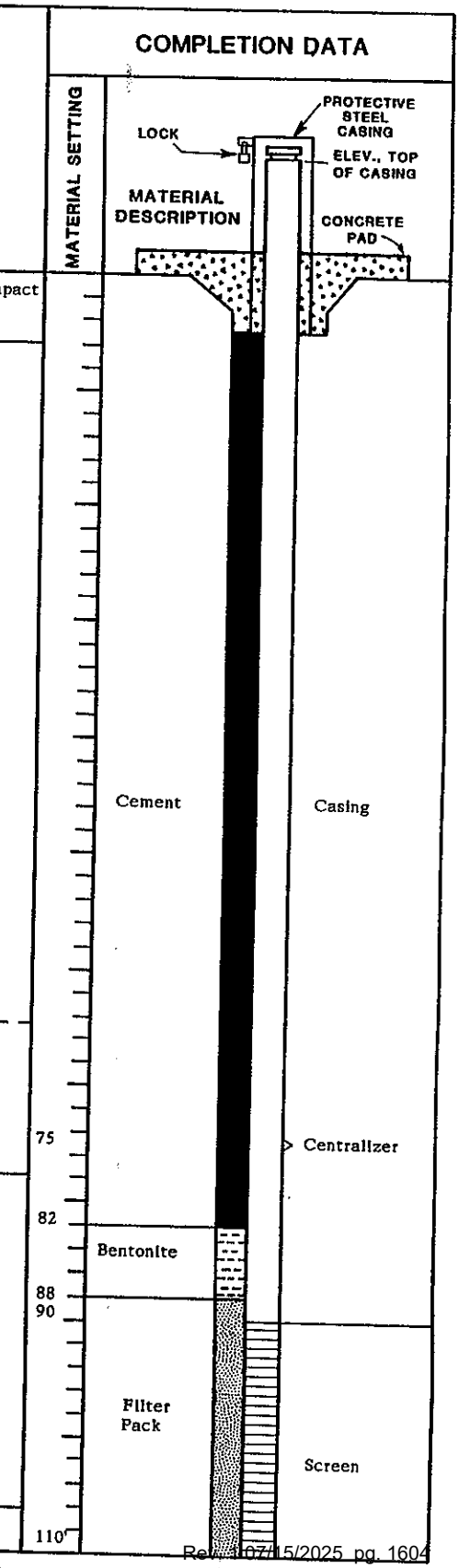
CLIENT: Fina Oil and Chemical Company JOB NO.: 119505 DATE DRILLED: 9-13-87 WELL NO.: MW-41

SITE: Big Spring, Texas ELEVATION: PAD 2486.59 TOP OF PVC CASING 2489.34

TOTAL DEPTH: 113.30' TOC CASING SIZE & TYPE: 2" ID PVC Flush Threaded SCREEN SIZE: 0.020 mill slot

WATER LEVEL: 91.80' REF.: TOC DATE: 10-1-87 TIME: 1510 Hours GEOLOGIST: Robert L. Sherrill

DEPTH	N. VALUE (BLOW/FT)	POCKET PENETROMETER (TONS/FT²)	SYMBOL	STRATIGRAPHY	SAMPLE DESCRIPTION
			SM		SILTY SAND - uniform fine grained, 15% highly plastic fines, compact grey, damp
10			SP		SAND - uniform fine grained, loose, red, dry
20			SP		SAND - similar to above
30			SP		SAND - similar to above
40			SP		SAND - similar to above
50			SP		SAND - similar to above
60			SP		SAND - similar to above
70			SP		SAND - uniform fine grain, dense, 15% calcareous cement, red, dry
80			SP		SAND - uniform fine grain, loose, red, moist
90			SP		SAND - similar to above ▼ Top of Saturation at 91.0' below grade
100			SP		SAND - similar to above except with minor calcareous fine gravel
			GP		SANDY GRAVEL - fine calcareous and chert gravel, 45% fine sand, loose, red



JONES AND NEUSE, INC. CONSULTING ENGINEERS AUSTIN, TEXAS

Monitor Well Installation

CLIENT: Fina Oil and Chemical Company JOB NO.: 119505 DATE DRILLED: 9-13-87 WELL NO.: MW-41

SITE: Big Spring, Texas ELEVATION: PAD 2486.59 TOP OF PVC CASING 2489.34

TOTAL DEPTH: 113.30' TOC CASING SIZE & TYPE: 2" ID PVC Flush Threaded SCREEN SIZE: 0.020 mill slot

WATER LEVEL: 91.80' REF.: TOC DATE: 10-1-87 TIME: 1510 hrs GEOLOGIST: Robert L. Sherrill

DEPTH	N. VALUE (BLOW/FT)	POCKET PENETROMETER (TONS/FT²)	SYMBOL	STRATIGRAPHY	SAMPLE DESCRIPTION	COMPLETION DATA: MATERIAL SETTING	COMPLETION DATA: MATERIAL DESCRIPTION CONT'D.
			GP		SANDY GRAVEL - similar to above	113	
					Boring Terminated at 113' below grade		
120							
130							
140							
150							
160							
170							
180							
190							
200							
210							

JONES AND NEUSE, INC. CONSULTING ENGINEERS AUSTIN, TEXAS

Monitor Well Installation

CLIENT: Fina Oil and Chemical Co. JOB NO.: 119505 DATE DRILLED: 9-12-87 WELL NO.: MW-41A

SITE: Big Spring, Texas ELEVATION: PAD 2487.05 TOP OF PVC CASING 2489.88

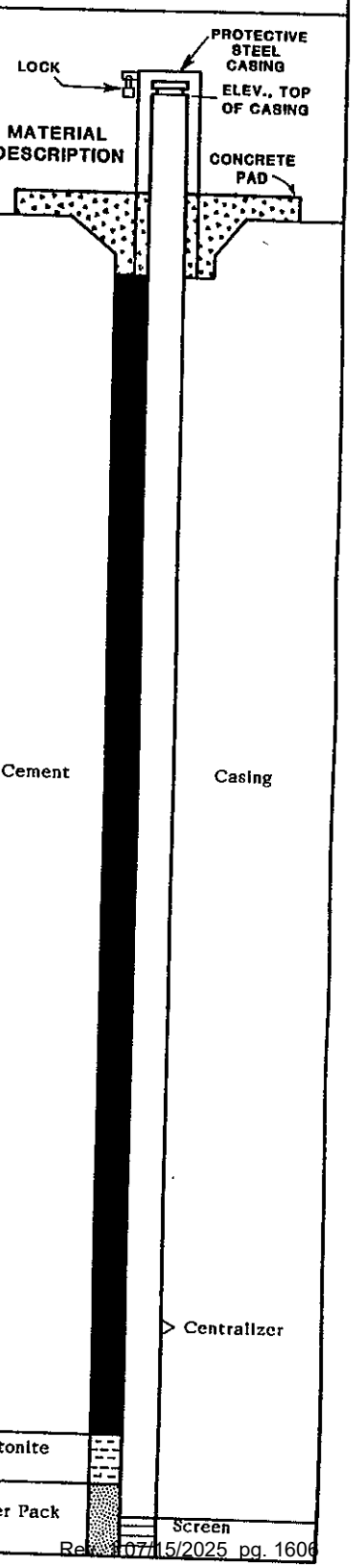
TOTAL DEPTH: 132.72' CASING SIZE & TYPE: 2" ID PVC Flush Threaded SCREEN SIZE: 0.020 mill slot

WATER LEVEL: 92.31' REF.: TOC DATE: 10-1-87 TIME: 1514 hrs. GEOLOGIST: Robert L. Sherrill

DEPTH	N. VALUE (BLOW/FT)	POCKET PENETROMETER (TONS/FT²)	SYMBOL	STRATIGRAPHY	SAMPLE DESCRIPTION
			SM		SILTY SAND - uniform fine grained, 15% highly plastic fines, compact grey, damp
10			SP		SAND - uniform fine grained, loose, red, dry
20			SP		SAND - similar to above
30			SP		SAND - similar to above
40			SP		SAND - similar to above
50			SP		SAND - similar to above
60			SP		SAND - similar to above
70			SP		SAND - uniform fine grain, dense, 15% calcareous cement, red, dry
80			SP		SAND - uniform fine grain, loose, red, moist
90			SP		SAND - similar to above Top of Saturation at 91.0' below grade
100			SP		SAND - similar to above except with minor calcareous fine gravel
			GP		SANDY GRAVEL - fine calcareous and chert gravel, 45% fine sand, loose, red

COMPLETION DATA

MATERIAL SETTING / MATERIAL DESCRIPTION



JONES AND NEUSE, INC. CONSULTING ENGINEERS AUSTIN, TEXAS

Monitor Well Installation

CLIENT: Fina Oil and Chemical Co JOB NO.: 119505 DATE DRILLED: 9-12-87 WELL NO.: MW-41A

SITE: Big Spring, Texas ELEVATION: PAD 2487.05 TOP OF PVC CASING 2489.88

TOTAL DEPTH: 132.72' TOC CASING SIZE & TYPE: 2" ID PVC Flush Threaded SCREEN SIZE: 0.020 mill slot

WATER LEVEL: 92.31' REF.: TOC DATE: 10-1-87 TIME: 1514 hrs. GEOLOGIST: Robert L. Sherrill

DEPTH	N. VALUE (BLOW/FT)	POCKET PENETROMETER (TONS/FT²)	SYMBOL	STRATIGRAPHY	SAMPLE DESCRIPTION
120			GP		SANDY GRAVEL - fine calcareous and chert gravel, 45% fine sand, loose, red
			GP		SANDY GRAVEL - similar to above
130			CH		CLAY - highly plastic, dense, red, dry — Ogallala FM, Dockum Group
					Boring Terminated at 135 feet below grade
140					
150					
160					
170					
180					
190					
200					
210					

COMPLETION DATA

MATERIAL SETTING	MATERIAL DESCRIPTION CONT'D.
123.2	Filter Pack
130	Collapse
135	

Screen

JONES AND NEUSE, INC. CONSULTING ENGINEERS AUSTIN, TEXAS

MONITOR WELL INSTALLATION

WELL NO.: MW-52

CLIENT: Fina Oil and Chemical Company JOB NO.: 119505 DATE DRILLED: _____ SHEET 1 of 2

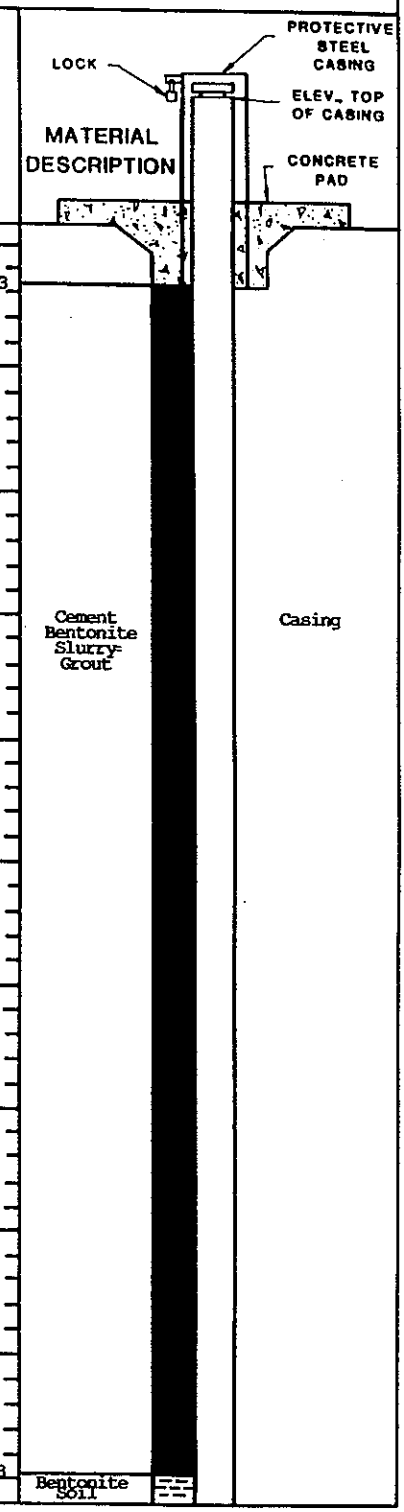
SITE: Site B/Big Spring, Texas ELEVATION: PAD 2515.35 TOP OF PVC CASING 2517.60

TOTAL DEPTH: 2390.10 CASING SIZE & TYPE: 2-inch ID PVC SCREEN SIZE: 0.010 mill slot

WATER LEVEL: 111.68 REF.: TOC DATE: 4/4/89 TIME: 1133 hrs GEOLOGIST: Robert L. Sherrill

DEPTH	N. VALUE (BLOW/FT)	POCKET PENETROMETER (TONS/FT²)	SYMBOL	STRATIGRAPHY	SAMPLE DESCRIPTION
0			SP		Sand - uniform fine, loose, orange, drill, FILL
10			SP		Sand - similar to above, FILL
20			SP		Sand - uniform fine, loose, red, dry
30			SP		Sand - similar to above with minor silt in pockets
40			SP		Sand - similar to above without silt
50			SP		Sand - similar to above with minor isolated calcareous gravel
60			SP		Gravelly Sand - similar to above except 10% fine subrounded calcareous gravel
70			SP		Gravelly Sand - similar to above except 15% medium subrounded calcareous gravel
80			SP		Gravelly Sand - similar to above
90			SP		Sand - uniform fine sand, loose, red, dry, no odor
100			SP		Sand - similar to above

COMPLETION DATA



JONES AND NEUSE, INC.
Engineering and Environmental Consultants
Austin, Houston, Bellaire, Temple, Corpus Christi, Orange

MONITOR WELL INSTALLATION

WELL NO.: MW-52

CLIENT: Fina Oil and Chemical Company JOB NO.: 119505 DATE DRILLED: _____ SHEET 2 of 2

SITE: Site B/Big Spring, Texas ELEVATION: PAD _____ TOP OF PVC CASING _____

TOTAL DEPTH: _____ CASING SIZE & TYPE: 2 in ID PVC SCREEN SIZE: 0.010 mill slot

WATER LEVEL : _____ REF.: TOC DATE: 4/4/89 TIME: _____ GEOLOGIST: Robert L. Sherrill

DEPTH	N. VALUE (BLOW/FT.)	POCKET PENETROMETER (TONS/FT^2)	SYMBOL	STRATIGRAPHY	SAMPLE DESCRIPTION
100					▼ Top of saturation
110			SP		Sand - similar to above except saturated
120			SP		Sand - similar to above
130			SP		Sand - similar to above
					Boring terminated at 130 feet

COMPLETION DATA

MATERIAL SETTING	MATERIAL DESCRIPTION CONT.
102.8	Bentonite Seal
105	Filter Pack
125	
130	

Casing

Screen

JONES AND NEUSE, INC.
Engineering and Environmental Consultants

MONITOR WELL INSTALLATION

WELL NO.: ~~MW-52A~~

CLIENT: Fina Oil and Chemical Company JOB NO.: 119505 DATE DRILLED: 3/31/89 SHEET 1 of 2

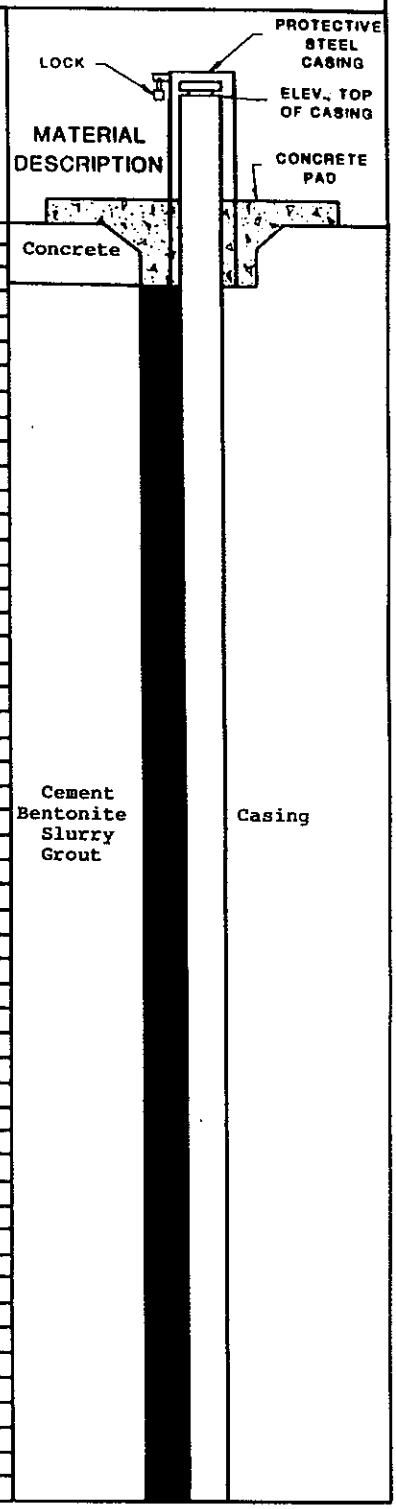
SITE: Site H/Big Spring, Texas ELEVATION: PAD 2515.33 TOP OF PVC CASING 2517.53

TOTAL DEPTH: 2358.08 CASING SIZE & TYPE: 2 in ID PVC SCREEN SIZE: 0.010 mill slot

WATER LEVEL: 111.50 REF.: TOC DATE: 4/4/89 TIME: 1130 hrs GEOLOGIST: Robert L. Sherrill

DEPTH	N. VALUE (BLOW/FT)	POCKET PENETROMETER (TONS/FT²)	SYMBOL	STRATIGRAPHY	SAMPLE DESCRIPTION
0			SP		Sand - uniform fine, loose, orange, dry, FILL
10			SP		Sand - similar to above, FILL
20			SP		Sand - uniform fine, loose, red, dry
30			SP		Sand - similar to above with minor silt in pockets
40			SP		Sand - similar to above without silt
50			SP		Sand - similar to above with minor
60			SP		Gravelly Sand - similar to above except 10% fine subrounded calcareous gravel
70			SP		Gravelly Snad - similar to above except 15% medium subrounded calcareous gravel
80			SP		Gravelly Sand - similar to above
90			SP		Sand - uniform fine sand, loose, red, dry, no odor
100			SP		Sand - similar to above

COMPLETION DATA



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MONITOR WELL INSTALLATION

WELL NO.: MW-52A

CLIENT: Fina Oil and Chemical Company JOB NO.: 119505 DATE DRILLED: _____ SHEET 2 of 2

SITE: Site H/ Big Spring, Texas ELEVATION: PAD 2515.33 TOP OF PVC CASING 2517.53

TOTAL DEPTH: 2358.08 CASING SIZE & TYPE: 2 in ID PVC SCREEN SIZE: 0.010 mill slot

WATER LEVEL : 111.50 REF.: TOC DATE: 4/4/89 TIME: 1130 hrs GEOLOGIST: Robert L. Shergill

DEPTH	N. VALUE (BLOW/FT.)	POCKET PENETROMETER (TONS/FT^2)	SYMBOL	STRATIGRAPHY	SAMPLE DESCRIPTION
100					▼ Top of Saturation
110			SP		Sand - similar to above except saturated
120			SP		Sand - similar to above
130			SP		Sand - similar to above
140			GP		Sandy Gravel - poorly graded, 90% rounded chert and calcareous gravel, medium, 10% fine sand, loose, red, saturated
			CH		Clay - highly plastic, hard, damp, red
150			GP		Sandy Gravel - poorly graded, 90% rounded chert and calcareous gravel, medium, 10% medium sand, loose, red, saturated
160			CH		Clay - highly plastic, hard, damp, red
					Boring terminated 160 feet below grade

COMPLETION DATA

MATERIAL SETTING	MATERIAL DESCRIPTION CONT.
	Cement/Bentonite Slurry Grout
131.9	
	Bentonite Seal
134.8	
137	
	Filter Pack
157	
157.3	Collapse
160	

Casing

Screen

JONES AND NEUSE, INC.
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MONITOR WELL INSTALLATION

WELL NO.: MW-53

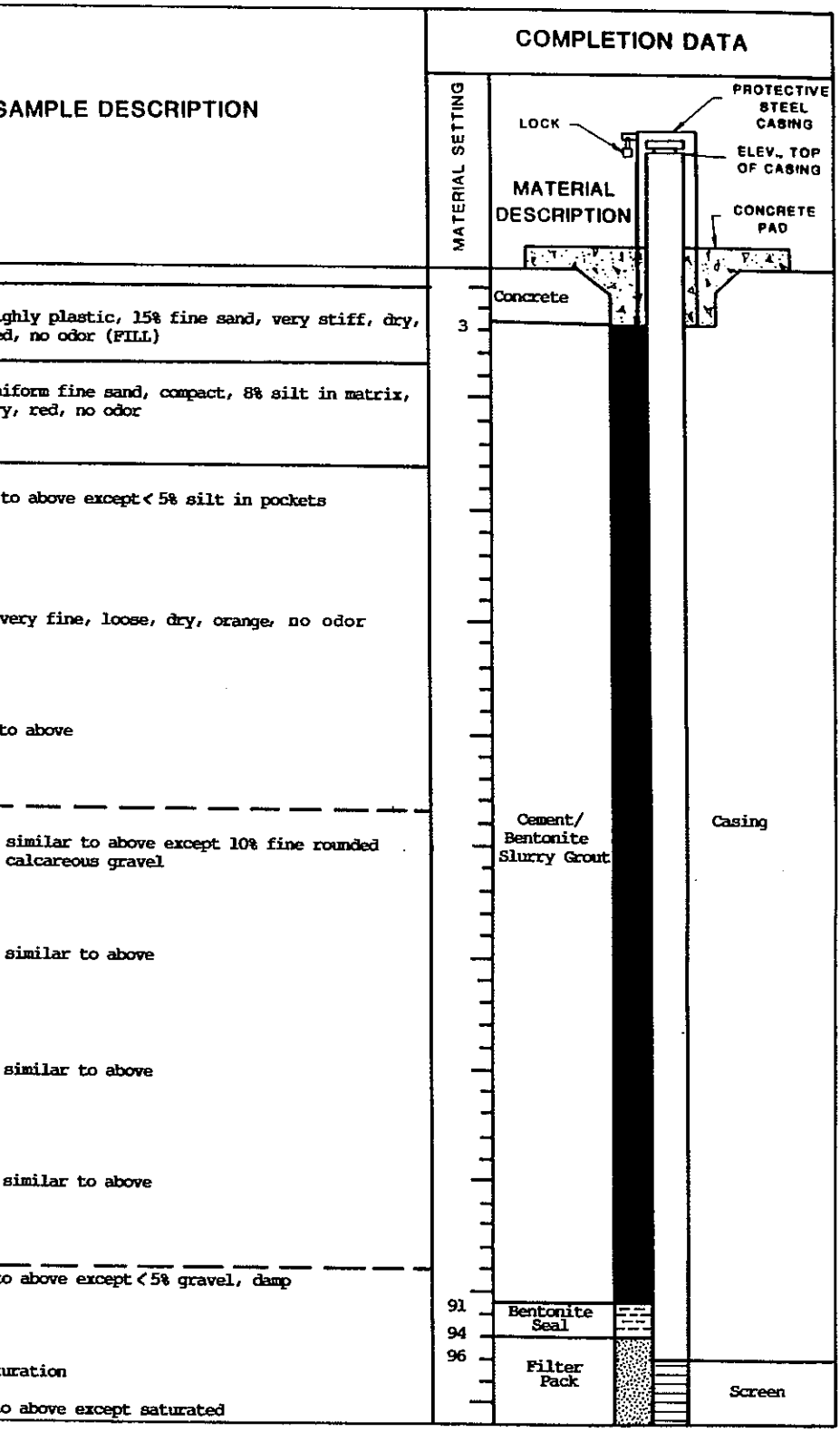
CLIENT: Pina Oil and Chemical Company JOB NO.: 119505 DATE DRILLED: 3/30/89 SHEET 1 of 2

SITE: Site H/Big Spring, Texas ELEVATION: PAD 2508.36 TOP OF PVC CASING 2510.06

TOTAL DEPTH: 2392.11 CASING SIZE & TYPE: 2 in ID PVC SCREEN SIZE: 0.010 mill slot

WATER LEVEL: 104.32 REF.: TOC DATE: 4/4/89 TIME: 1118 hrs GEOLOGIST: Robert L. Sherrill

DEPTH	N. VALUE (BLOW/FT)	POCKET PENETROMETER (TONS/FT²)	SYMBOL	STRATIGRAPHY	SAMPLE DESCRIPTION
0			CL		Sandy Clay - highly plastic, 15% fine sand, very stiff, dry, red, no odor (FILL)
10			SM		Silty Sand - uniform fine sand, compact, 8% silt in matrix, dry, red, no odor
20			SP		Sand - similar to above except < 5% silt in pockets
30			SP		Sand - uniform very fine, loose, dry, orange, no odor
40			SP		Sand - similar to above
50			SP		Gravelly Sand - similar to above except 10% fine rounded calcareous gravel
60			SP		Gravelly Sand - similar to above
70			SP		Gravelly Sand - similar to above
80			SP		Gravelly Sand - similar to above
90			SP		Sand - similar to above except < 5% gravel, damp
					Top of Saturation
100			SP		Sand - similar to above except saturated



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MONITOR WELL INSTALLATION

WELL NO.: MW-53

CLIENT: Pine Oil and Chemical Company JOB NO.: 119505 DATE DRILLED: 3/30/89 SHEET 2 of 2

SITE: Site B/Big Spring, Texas ELEVATION: PAD 2508.36 TOP OF PVC CASING 2510.06

TOTAL DEPTH: 2392.11 CASING SIZE & TYPE: 2 in ID PVC SCREEN SIZE: 0.010 mill slot

WATER LEVEL : 104.32 REF.: TOC DATE: 4/4/89 TIME: 1118 hrs GEOLOGIST: Robert L. Sherrill

DEPTH	N. VALUE (BLOW/FT.)	POCKET PENETROMETER (TONS/FT^2)	SYMBOL	STRATIGRAPHY	SAMPLE DESCRIPTION
100					
110			SP		Sand - similar to above
120			GP		Sandy Gravel - poorly graded, fine to medium subrounded chert gravel, 10% fine sand, loose, red, saturated
130			GP		Sandy Gravel- similar to above
					Boring terminated at 130 feet

COMPLETION DATA

MATERIAL SETTING	MATERIAL DESCRIPTION CONT.
	Filter Pack
116	
118	Collapse
130	

Screen

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MONITOR WELL INSTALLATION

WELL NO.: MW-53A

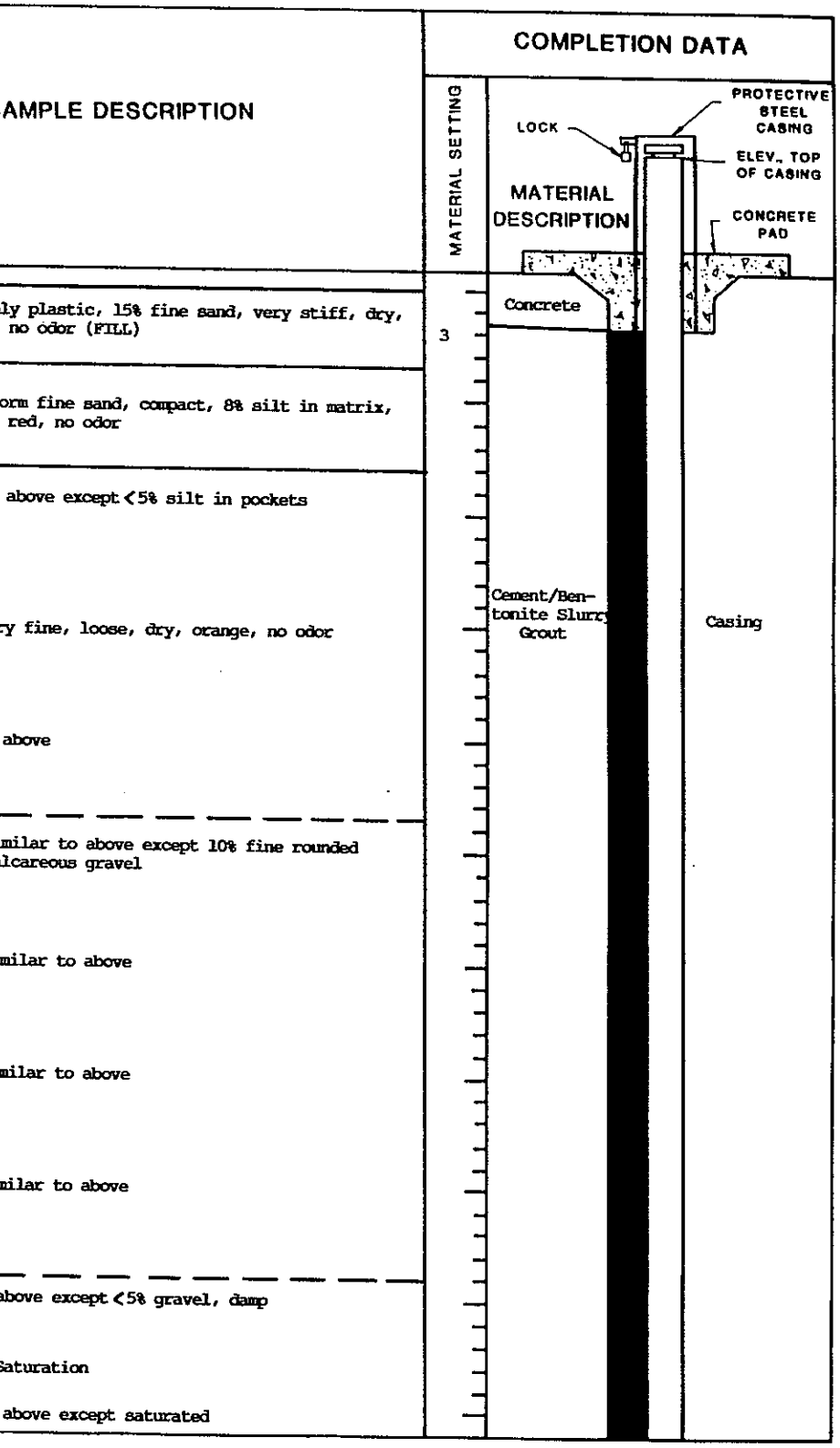
CLIENT: Fina Oil and Chemical Company JOB NO.: 119505 DATE DRILLED: 3/30/89 SHEET 1 of 2

SITE: Site B/Big Spring, Texas ELEVATION: PAD 2508.24 TOP OF PVC CASING 2509.89

TOTAL DEPTH: 2370.99 CASING SIZE & TYPE: 2 in ID PVC SCREEN SIZE: 0.010 mill slot

WATER LEVEL: 104.08 REF.: TOC DATE: 4/4/89 TIME: 1115 hrs GEOLOGIST: Robert L. Sherrill

DEPTH	N. VALUE (BLOW/FT)	POCKET PENETROMETER (TONS/FT²)	SYMBOL	STRATIGRAPHY	SAMPLE DESCRIPTION
0			CL		Sandy Clay – highly plastic, 15% fine sand, very stiff, dry, red, no odor (FILL)
10			SM		Silty Sand – uniform fine sand, compact, 8% silt in matrix, dry, red, no odor
20			SP		Sand – similar to above except <5% silt in pockets
30			SP		Sand – uniform very fine, loose, dry, orange, no odor
40			SP		Sand – similar to above
50			SP		Gravelly Sand – similar to above except 10% fine rounded calcareous gravel
60			SP		Gravelly Sand – similar to above
70			SP		Gravelly Sand – similar to above
80			SP		Gravelly Sand – similar to above
90			SP		Sand – similar to above except <5% gravel, damp
					▼ Top of Saturation
100			SP		Sand – similar to above except saturated



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MONITOR WELL INSTALLATION

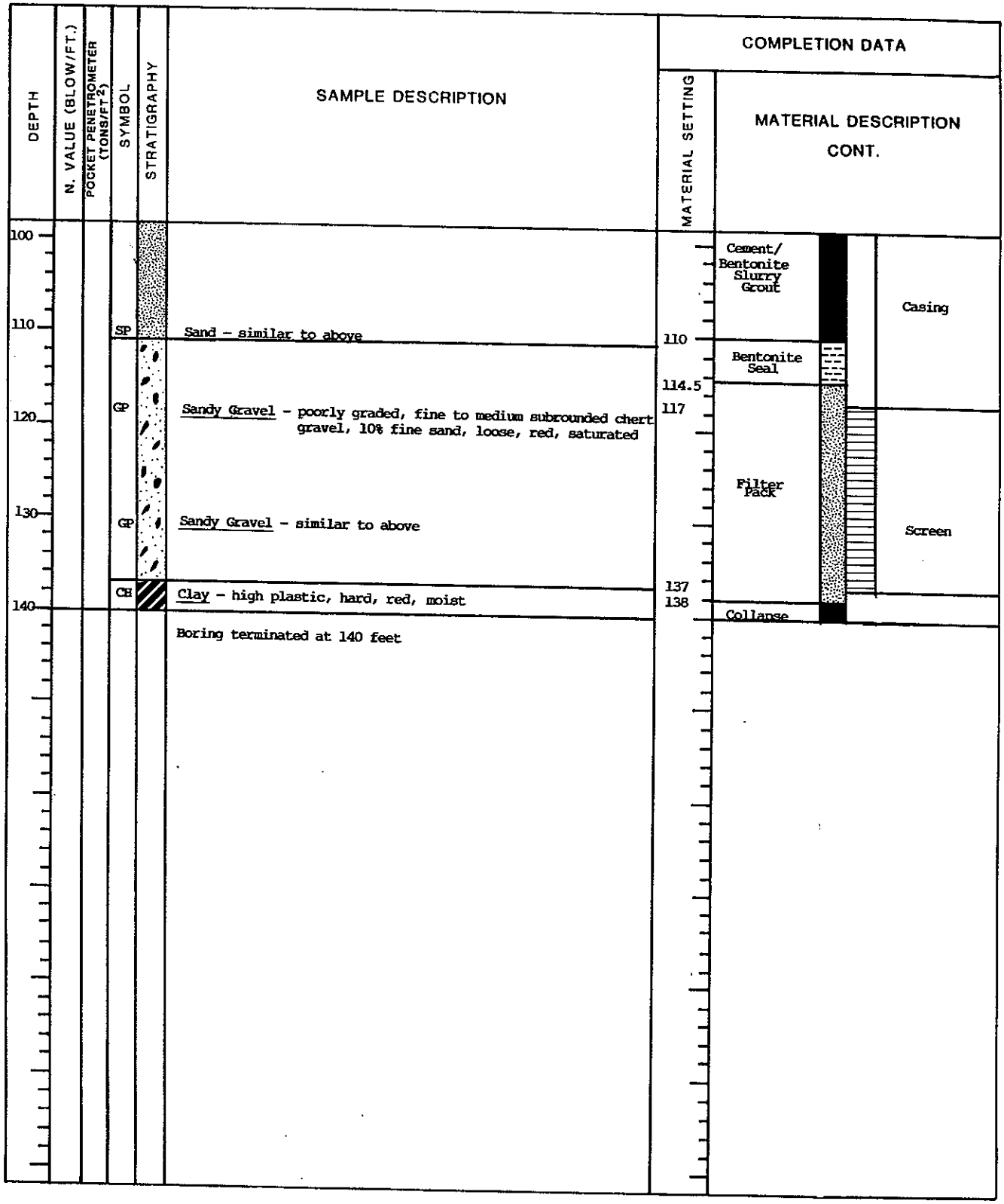
WELL NO.: MW-53A

CLIENT: Fina Oil and Chemical Company JOB NO.: 119505 DATE DRILLED: 4/4/89 SHEET 2 of 2

SITE: Site B/Big Spring, Texas ELEVATION: PAD 2508.24 TOP OF PVC CASING 2509.89

TOTAL DEPTH: 2370.99 CASING SIZE & TYPE: 2 in ID PVC SCREEN SIZE: 0.010 mill slot

WATER LEVEL : 104.08 REF.: TOC DATE: 4/4/89 TIME: 1115 hrs GEOLOGIST: Robert L. Sherrill



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MONITOR WELL INSTALLATION

WELL NO.: MW- 54

CLIENT: Fina Oil and Chemical Company JOB NO.: 119505 DATE DRILLED: 3/27/89 SHEET 1 of 2

SITE: Site B/Big Spring, Texas ELEVATION: PAD 2505.41 TOP OF PVC CASING 2506.71

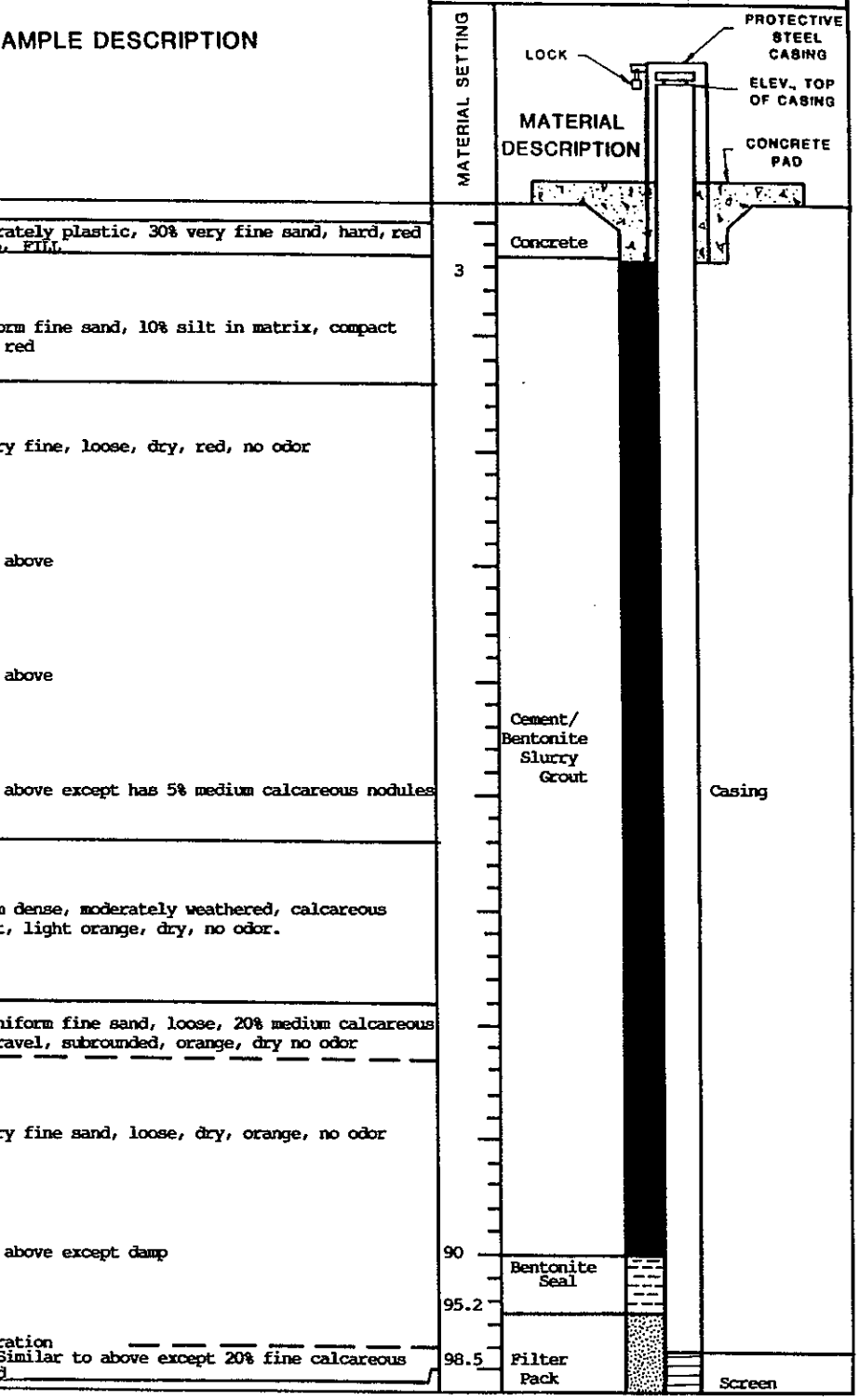
TOTAL DEPTH: 2386.66 CASING SIZE & TYPE: 2-inch PVC SCREEN SIZE: 0.010 mill slot

WATER LEVEL: 100.51 REF.: TOC DATE: 4/4/89 TIME: 1105 hrs GEOLOGIST: Robert L. Sherrill

DEPTH	N. VALUE (BLOW/FT)	POCKET PENETROMETER (TONS/FT2)	SYMBOL	STRATIGRAPHY	SAMPLE DESCRIPTION
0			CL		Sandy Clay – Moderately plastic, 30% very fine sand, hard, red damp, FILL
10			SM		Silty Sand – Uniform fine sand, 10% silt in matrix, compact dry, red
20			SP		Sand – Uniform very fine, loose, dry, red, no odor
30			SP		Sand – Similar to above
40			SP		Sand – Similar to above
50			SP		Sand – Similar to above except has 5% medium calcareous nodules
60			SS		Sandstone – Medium dense, moderately weathered, calcareous cement, light orange, dry, no odor.
70			SP		Gravelly Sand – Uniform fine sand, loose, 20% medium calcareous gravel, subrounded, orange, dry no odor
80			SP		Sand – Uniform very fine sand, loose, dry, orange, no odor
90			SP		Sand – Similar to above except damp
100			SP		Top of Saturation Gravelly Sand – Similar to above except 20% fine calcareous gravel, saturated

COMPLETION DATA

MATERIAL SETTING	MATERIAL DESCRIPTION
3	Concrete
	Cement/ Bentonite Slurry Grout
90	Bentonite Seal
95.2	Filter Pack
98.5	



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MONITOR WELL INSTALLATION

WELL NO.: MW-54

CLIENT: Pina Oil and Chemical Company JOB NO.: 119505 DATE DRILLED: 3/28/89 SHEET 2 of 2

SITE: Site B/Big Spring, Texas ELEVATION: PAD 2505.56 TOP OF PVC CASING 2507.04

TOTAL DEPTH: 2367.31 CASING SIZE & TYPE: 2-inch ID PVC SCREEN SIZE: 0.010 Mill Slot

WATER LEVEL : 100.50 REF.: TOC DATE: 4/4/89 TIME: 1110 hrs GEOLOGIST: Robert L. Sherrill

DEPTH	N. VALUE (BLOW/FT.)	POCKET PENETROMETER (TONS/FT^2)	SYMBOL	STRATIGRAPHY	SAMPLE DESCRIPTION
100					
110			GP		Sandy Gravel - uniform fines ubrounded calcareous gravel, loose, 40% fine sand, orange, saturated, no odor
120			SP		Gravelly Sand - similar to above except with 40% gravel
130			GP		Gravel - uniform medium subrounded chert gravel, loose, 5% medium sand, tan,s aturated, no odor
140			CH		Clay - highly plastic, hard, red, moist, no odor
150			CH		Clay - similar to above
					Boring terminated at 150 feet

COMPLETION DATA

MATERIAL SETTING	MATERIAL DESCRIPTION CONT.
118.5	Filter Pack / Screen
122	Collapse
150	

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MONITOR WELL INSTALLATION

WELL NO.: ~~MW~~ 54A

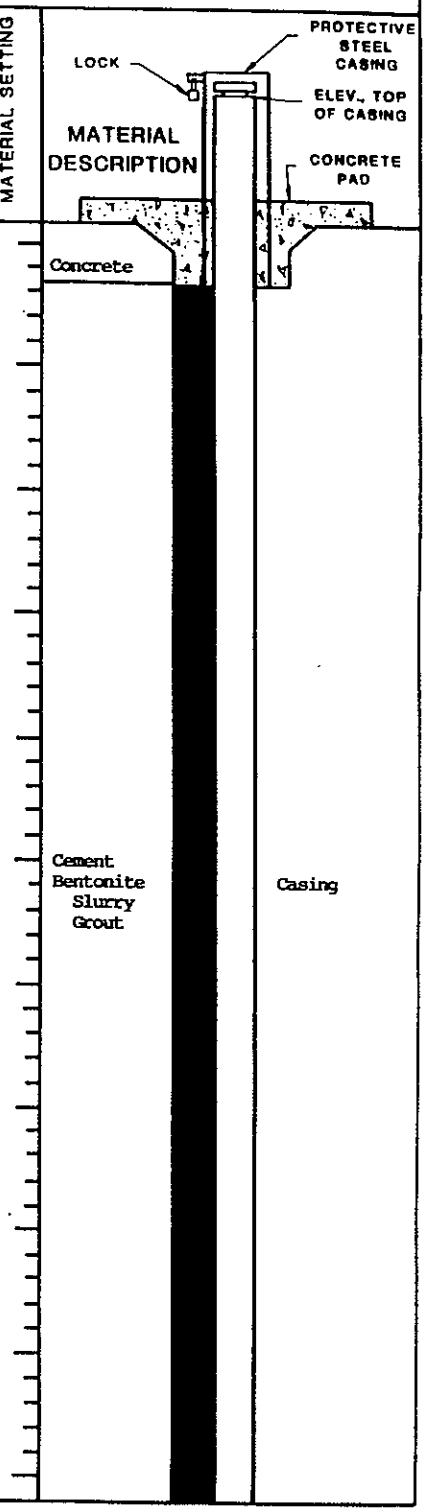
CLIENT: Fina Oil and Chemical Company JOB NO.: 119505 DATE DRILLED: 3/28/89 SHEET 1 of 2

SITE: Site H/Big Spring, TX ELEVATION: PAD 2505.56 TOP OF PVC CASING 2507.04

TOTAL DEPTH: 2367.31 CASING SIZE & TYPE: 2 in ID PVC SCREEN SIZE: 0.010 mill slot

WATER LEVEL: 100.50 REF.: TOC DATE: 4/4/89 TIME: 1110 hrs GEOLOGIST: Robert L. Sherrill

DEPTH	N. VALUE (BLOW/FT)	POCKET PENETROMETER (TONS/FT2)	SYMBOL	STRATIGRAPHY	SAMPLE DESCRIPTION
0			CL		Sandy Clay - moderately plastic, 30% very fine sand, hard, red, damp; FILL
10			SM		Silty Sand - uniform fine sand, 10% silt in matrix, compact, dry, red
20			SP		Sand - uniform very fine, loose, dry, red, no odor
30			SP		Sand - similar to above
40			SP		Sand - similar to above
50			SP		Sand - siilar to abovve except has 5% medium calcareous nodules
60			SS		Sandstone - medium dense, moderately weathered, calcareous cement, light orange, dry, no odor
70			SP		Gravelly Sand - uniform fine sand, loose, 20% medium calcareous gravel, subrounded, orange, dry, no odor
80			SP		Sand - uniform very fine sand, loose, dry, orange, no odor
90			SP		Sand - similar to above except damp
					Top of Saturation
100			SP		Gravelly Sand -similar to above except 20% fine calcareous gravel, saturated



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MONITOR WELL INSTALLATION

WELL NO.: MW-54A

CLIENT: Fina Oil and Chemical Company JOB NO.: 119505 DATE DRILLED: 3/28/89 SHEET 2 of 2

SITE: Site H/Big Spring, Texas ELEVATION: PAD 2505.56 TOP OF PVC CASING 2507.04

TOTAL DEPTH: 2367.31 CASING SIZE & TYPE: 2 cm OD SVC SCREEN SIZE: 0.010 mill slot

WATER LEVEL : 100.50 REF.: TOC DATE: 4/4/89 TIME: 1110 hrs GEOLOGIST: Robert L. Sherrill

DEPTH	N. VALUE (BLOW/FT.)	POCKET PENETROMETER (TONS/FT^2)	SYMBOL	STRATIGRAPHY	SAMPLE DESCRIPTION
100					
110			GP		Sandy Gravel - uniform fine subrounded calcareous gravel, loose, 40% fine sand, orange, saturated no odor
120			SP		Gravelly Sand - Similar to above except with 40% gravel
130			GP		Gravel - Uniform medium subrounded chert gravel, loose 5% medium snad, tan, saturated, no odor
140			CH		Clay - Highly plastic, hard, red, moist, no odor
150			CH		Clay - Similar to above
					Boring terminated at 150 feet

COMPLETION DATA

MATERIAL SETTING	MATERIAL DESCRIPTION CONT.
	Cement/ Bentonite Slurry Grout
112	
	Bentonite Seal
116	
118	
	Filter Pack
138	
139	
	Collapse
150	

Casing

Screen

JONES AND NEUSE, INC.
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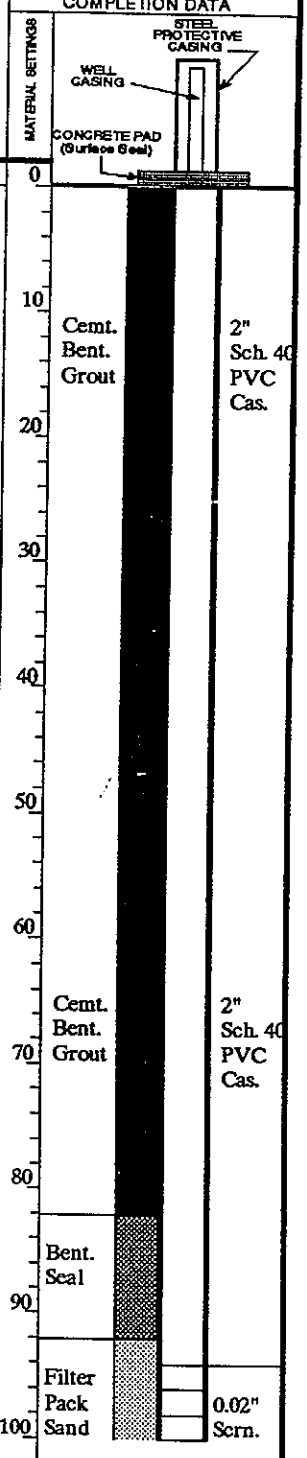
MONITOR WELL CONSTRUCTION

CLIENT: FINA OIL & CHEMICAL CO | JOB NO: 019505.1 | WELL NO. MW–74 | SHEET 1 OF 2
SITE: BIG SPRING, TEXAS | DATE: START: June 4, 1992 | FINISH: June 4, 1992
GEOLOGIST: James D. Shotwell | DRILLER: Dusty Choate | DRILLING RIG TYPE: Failing 1000
DRILLING METHODS: Air Rotary | TOTAL DEPTH: 120 feet | HOLE DIAMETER: 6.75 inches
SITE COORDINATES: 247164.57' N + 790467.96' E | ELEVATIONS: GROUND: NA | PAD: 2505.64 | TOC: 2508.39 | PROT. CSG: 2508.64
WATER LEVEL: DEPTH: 103.13 Feet | DATUM: TOC | DATE: June 19, 1992 | TIME: 7:20 AM

JONES AND NEUSE, INC.
Environmental and Engineering Consultants

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION
0				SP		SAND uniform, fine grained, mod. cemented, red, slightly moist.
10				SP		SAND uniform, fine grained, loose, red, slightly moist.
20				SP		SAND as above.
30				SP		SAND as above.
40				SP		SAND as above.
50				SP		SAND as above.
60				SP		GRAVELLY SAND as above, with <2% GRAVEL fine, loose, calcareous and cherty, white to off–white, dry.
70				SP		SAND uniform, fine grained, loose, red, dry.
80				SP		SAND as above.
90				SP		SAND as above, becoming moist.
						SATURATION @ 95 FEET
100						(Continued on page 2)

COMPLETION DATA



(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MW–STAND.WK3

MONITOR WELL CONSTRUCTION

CLIENT: FINA OIL & CHEMICAL COMPANY JOB NO: 019505.1 WELL NO. MW-74
SITE: BIG SPRING, TEXAS DATE: START: June 4, 1992 SHEET 2 OF 2 FINISH: June 4, 1992
GEOLOGIST: James D. Shotwell DRILLER: Dusty Choate DRILLING RIG TYPE: Failing 1000
DRILLING METHODS: Air Rotary TOTAL DEPTH: 120 feet HOLE DIAMETER: 6.75 inches
SITE COORDINATES: 247164.57' N + 790467.96' E ELEVATIONS: GROUND: NA PAD: 2505.64 TOC: 2508.39 PROT. CSG: 2508.64
WATER LEVEL: DEPTH: 103.13 Feet DATUM: TOC DATE: June 19, 1992 TIME: 7:20 AM

JONES AND NEUSE, INC.
Environmental and Engineering Consultants

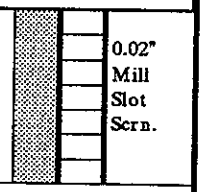
LITHOLOGIC DESCRIPTION

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION
100	X			SP		SAND as above, saturated.
110	X			SP		SAND as above.
120	X			SP		GRAVELLY SAND uniform, fine grained, loose, red, saturated, with <5% GRAVEL calcareous and cherty, loose, fine, dark gray.
						Boring terminated 120 feet below grade.

COMPLETION DATA

MATERIAL SETTINGS

BELOW GRADE MATERIAL COMPLETIONS CONTINUED FROM PREVIOUS PAGE



(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MW-P2-SC.WK3

MONITOR WELL CONSTRUCTION

CLIENT: FINA OIL & CHEMICAL CO | JOB NO: 019505.1 | WELL NO. MW-74A
SITE: BIG SPRING, TEXAS | DATE: START: June 3, 1992 | SHEET 1 OF 2 | FINISH: June 3, 1992
GEOLOGIST: James D. Shotwell | DRILLER: Dusty Choate | DRILLING RIG TYPE: Failing 1000
DRILLING METHODS: Air Rotary | TOTAL DEPTH: 170 feet | HOLE DIAMETER: 6.75 inches
SITE COORDINATES: 247162.30' N + 790458.62' E | ELEVATIONS: GROUND: NA | PAD: 2505.62 | TOC: 2508.38 | PROT. CSG: 2508.62
WATER LEVEL: DEPTH: 102.44 Feet | DATUM: TOC | DATE: June 19, 1992 | TIME: 7:20 AM

JONES AND NEUSE, INC.
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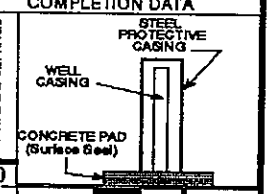
DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION
0				SP		SAND uniform, fine grained, mod. cemented, red, slightly moist.
10				SP		SAND uniform, fine grained, loose, red, slightly moist.
20				SP		SAND as above.
30				SP		SAND as above.
40				SP		SAND as above.
50				SP		SAND as above.
60				SP		GRAVELLY SAND as above, with <2% GRAVEL fine, loose, calcareous and cherty, white to off-white, dry.
70				SP		SAND uniform, fine grained, loose, red, dry.
80				SP		SAND as above.
90				SP		SAND as above, becoming moist.
						SATURATION @ 95 FEET
100						(Continued on page 2)

COMPLETION DATA



(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MW-STAND.WK3

MONITOR WELL CONSTRUCTION

CLIENT: FINA OIL & CHEMICAL COMPANY | JOB NO: 019505.1 | WELL NO. MW-74A | SHEET 2 OF 2

SITE: BIG SPRING, TEXAS | DATE: START: June 3, 1992 | FINISH: June 3, 1992

GEOLOGIST: James D. Shotwell | DRILLER: Dusty Choate | DRILLING RIG TYPE: Failing 1000

DRILLING METHODS: Air Rotary | TOTAL DEPTH: 170 feet | HOLE DIAMETER: 6.75 inches

SITE COORDINATES: 247162.30' N + 790458.62' E | ELEVATIONS: GROUND: NA | PAD: 2505.62 | TOC: 2508.38 | PROT. CSG: 2508.62

WATER LEVEL: DEPTH: 102.44 Feet | DATUM: TOC | DATE: June 19, 1992 | TIME: 7:20 AM

JONES AND NEUSE, INC.
Environmental and Engineering Consultants

LITHOLOGIC DESCRIPTION

DEPTH (FEET)	USCS SYMBOL (1)	LITHOLOGIC DESCRIPTION
100	SP	SAND as above, saturated.
110	SP	SAND as above.
120	SP	GRAVELLY SAND uniform, fine grained, loose, red, saturated, with <5% GRAVEL calcareous and cherty, loose, fine dark gray.
130	SP	GRAVELLY SAND As above, increasing GRAVEL to 10%.
	CH	CLAY (@135') highly plastic, hard, red, dry.
140	SP	GRAVELLY SAND uniform, fine grained, loose, red, saturated, with <10% GRAVEL calcareous and cherty, loose, fine, dark gray.
150	CH	TOP DOCKUM CLAY highly plastic, hard, red, dry.
	CH	TOP DOCKUM CLAY highly plastic, hard, red, dry.
160	CH	TOP DOCKUM CLAY highly plastic, hard, red, dry.
170	CH	TOP DOCKUM CLAY highly plastic, hard, red, dry.
		Boring terminated at 170 feet below grade.
180		
190		
200		

COMPLETION DATA

BELOW GRADE MATERIAL COMPLETIONS CONTINUED FROM PREVIOUS PAGE

- Bent. Seal
- 2" Sch 40 PVC Cas.
- Filter Pack Sand
- 0.02" PVC Mill Slot Scrn.

(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MW-P2-SC.WK3

MONITOR WELL CONSTRUCTION

WELL NO. MW-75

CLIENT: FINA OIL & CHEMICAL COMPANY JOB NO: 019505.1 SHEET 1 OF 2

SITE: BIG SPRING, TEXAS DATE: START: June 4, 1992 FINISH: June 4, 1992

GEOLOGIST: James D. Shotwell DRILLER: Dusty Choate DRILLING RIG TYPE: Failing 1000

DRILLING METHODS: Air Rotary TOTAL DEPTH: 130 feet HOLE DIAMETER: 6.75 inches

SITE COORDINATES: 247088.75' N + 790222.09' E ELEVATIONS: GROUND: NA PAD: 2506.79 TOC: 2509.54 PROT. CSG: 2509.74

WATER LEVEL: DEPTH: 102.54 Feet DATUM: TOC DATE: June 10, 1992 TIME: 8:40 AM

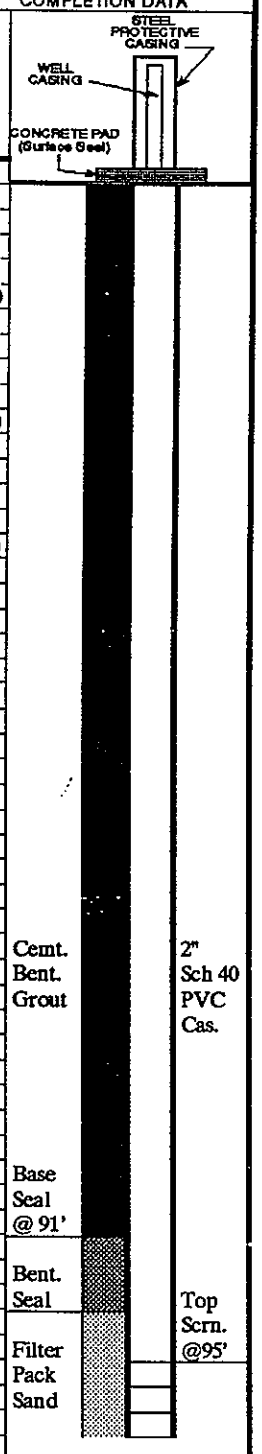
JONES AND NEUSE, INC.
Environmental and Engineering Consultants

LITHOLOGIC DESCRIPTION

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	
0				SP	SAND	uniform, fine grained, loose, red, damp.
10				SP	SAND	As above.
20				SP	SAND	As above.
30				SP	SAND	As above.
40				SP	SAND	As above.
50				SP	SAND	As above.
60				SP	SAND	As above.
70				SP	SAND	As above.
80				SP	SAND	As above.
90				SP	SAND	As above, becoming moist.
100						SATURATION @ 96 FEET

(Continued on page 2)

COMPLETION DATA



(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MW-STAND.WK3

MONITOR WELL CONSTRUCTION

WELL NO. MW-75

CLIENT: FINA OIL & CHEMICAL COMPANY JOB NO: 019505.1 SHEET 2 OF 2

SITE: BIG SPRING, TEXAS DATE: START: June 4, 1992 FINISH: June 4, 1992

GEOLOGIST: James D. Shotwell DRILLER: Dusty Choate DRILLING RIG TYPE: Failing 1000

DRILLING METHODS: Air Rotary TOTAL DEPTH: 130 feet HOLE DIAMETER: 6.75 inches

SITE COORDINATES: 247088.75' N + 790222.09' E ELEVATIONS: GROUND: NA PAD: 2506.79 TOC: 2509.54 PROT. CSG: 2509.74

WATER LEVEL: DEPTH: 102.54 Feet DATUM: TOC DATE: June 10, 1992 TIME: 8:40 AM

JONES AND NEUSE, INC.
Environmental and Engineering Consultants

LITHOLOGIC DESCRIPTION

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	
100				SP	SAND	As above, saturated.
110				SP	SAND	As above.
120				SP	SAND	As above.
130				SP	SAND	As above.
						Boring terminated at 130 feet below grade.

COMPLETION DATA

MATERIAL SETTINGS

BELOW GRADE MATERIAL COMPLETIONS CONTINUED FROM PREVIOUS PAGE

Filter Pack Sand

0.02" PVC Mill Slot Scrn.

Screen set @ 115'

(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MW-P2-SC.WK3

MONITOR WELL CONSTRUCTION

WELL NO. MW-75A

CLIENT: FINA OIL & CHEMICAL COMPANY JOB NO: 019505.1 SHEET 1 OF 2

SITE: BIG SPRING, TEXAS DATE: START: June 4, 1992 FINISH: June 4, 1992

GEOLOGIST: James D. Shotwell DRILLER: Dusty Choate DRILLING RIG TYPE: Failing 1000

DRILLING METHODS: Air Rotary TOTAL DEPTH: 160 feet HOLE DIAMETER: 6.75 inches

SITE COORDINATES: 247091.88' N + 790230.16' E ELEVATIONS: GROUND: NA PAD: 2506.74 TOC: 2509.55 PROT. CSG: 2509.74

WATER LEVEL: DEPTH: 102.97 Feet DATUM: TOC DATE: June 10, 1992 TIME: 8:40 AM

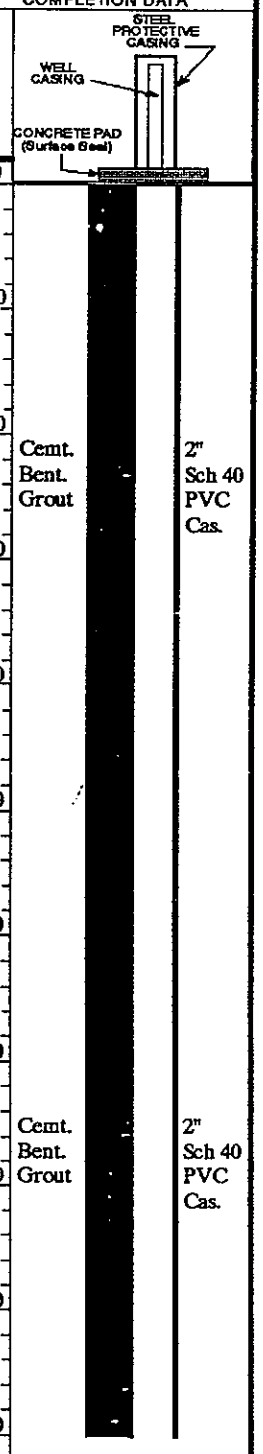
JONES AND NEUSE, INC.
Environmental and Engineering Consultants

LITHOLOGIC DESCRIPTION

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	
0	X			SP		SAND uniform, fine grained, loose, red, damp.
10	X			SP		SAND As above.
20	X			SP		SAND As above.
30	X			SP		SAND As above.
40	X			SP		SAND As above.
50	X			SP		SAND As above.
60	X			SP		SAND As above.
70	X			SP		SAND As above.
80	X			SP		SAND As above.
90	X			SP		SAND As above, becoming moist.
						SATURATION @ 96 FEET
100						

(Continued on page 2)

COMPLETION DATA



(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MW-STAND.WK3

MONITOR WELL CONSTRUCTION

WELL NO. MW-75A

CLIENT: FINA OIL & CHEMICAL COMPANY JOB NO: 019505.1 SHEET 2 OF 2

SITE: BIG SPRING, TEXAS DATE: START: June 4, 1992 FINISH: June 4, 1992

GEOLOGIST: James D. Shotwell DRILLER: Dusty Choate DRILLING RIG TYPE: Failing 1000

DRILLING METHODS: Air Rotary TOTAL DEPTH: 160 feet HOLE DIAMETER: 6.75 inches

SITE COORDINATES: 247091.88' N + 790230.16' E ELEVATIONS: GROUND: NA PAD: 2506.74 TOC: 2509.55 PROT. CSG: 2509.74

WATER LEVEL: DEPTH: 102.97 Feet DATUM: TOC DATE: June 10, 1992 TIME: 8:40 AM

JONES AND NEUSE, INC.
Environmental and Engineering Consultants

LITHOLOGIC DESCRIPTION

DEPTH (FEET)	USCS SYMBOL (1)	LITHOLOGIC DESCRIPTION
100	SP	SAND As above, saturated.
110	SP	SAND As above.
120	SP	SAND As above.
130	SP	GRAVELLY SAND uniform, fine to very fine grained, loose, red, saturated, with <2% GRAVEL fine, loose, calcareous, cherty, off-white.
140	CH	CLAY highly plastic, hard, red, dry.
	CH	CLAY As above.
150	SP	GRAVELLY SAND uniform, fine to very fine grained, loose, red, saturated, with <20% GRAVEL fine, loose, calcareous, cherty, off-white.
160	CH	TOP DOCKUM CLAY @ 155' highly plastic, hard, red, dry.
		Boring terminated at 160 feet below grade.
170		
180		
190		
200		

COMPLETION DATA

BELOW GRADE MATERIAL COMPLETIONS CONTINUED FROM PREVIOUS PAGE

Cemt. Bent. Grout

Seal @ 115'

Bent. Seal

Filter Pack Sand

2" Sch 40 PVC Cas.

Top Screen @ 135'

0.02" PVC Mill Slot Scrn.

Screen set @ 155'

(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MW-P2-SC.WK3

MONITOR WELL CONSTRUCTION

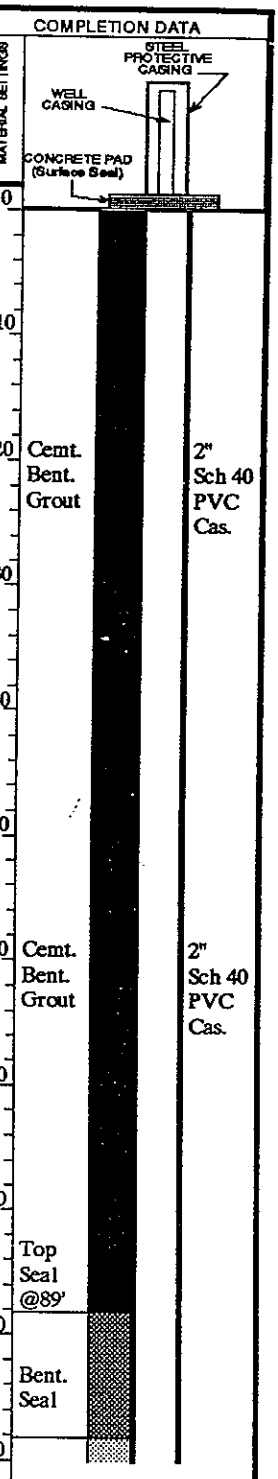
CLIENT: FINA OIL & CHEMICAL COMPANY JOB NO: 019505.1 WELL NO. MW-76
SITE: BIG SPRING, TEXAS DATE: START: June 5, 1992 SHEET 1 OF 2 FINISH: June 5, 1992
GEOLOGIST: James D. Shotwell DRILLER: Dusty Choate DRILLING RIG TYPE: Failing 1000
DRILLING METHODS: Air Rotary TOTAL DEPTH: 130 feet HOLE DIAMETER: 6.75 inches
SITE COORDINATES: 247976.00' N + 790629.76' E ELEVATIONS: GROUND: NA PAD: 2519.47 TOC: 2522.22 PROT. CSG: 2522.47
WATER LEVEL: DEPTH: 116.36 Feet DATUM: TOC DATE: June 11, 1992 TIME: 9:05 AM

JONES AND NEUSE, INC.
Environmental and Engineering Consultants

LITHOLOGIC DESCRIPTION

DEPTH (FEET)	USCS SYMBOL (1)	LITHOLOGIC DESCRIPTION
0	SP	SAND uniform, fine grained, loose, red, moist.
10	SP	SAND as above.
20	SP	SAND as above.
30	SP	SAND as above.
40	SP	SAND as above, dry.
50	SP	GRAVELLY SAND uniform, fine grained, loose, red, dry, with <2% GRAVEL fine, loose, calcareous, cherty, off-white, dry.
60	SP	SAND uniform, fine grained, red, dry.
70	SP	SAND as above.
80	SP	SAND as above.
90	SP	SAND as above.
100	SP	SAND as above, becoming damp.

COMPLETION DATA



(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MW-STAND.WK3

MONITOR WELL CONSTRUCTION

CLIENT: FINA OIL & CHEMICAL COMPANY | JOB NO: 019505.1 | WELL NO. MW-76
SITE: BIG SPRING, TEXAS | DATE: START: June 5, 1992 | SHEET 2 OF 2 | FINISH: June 5, 1992
GEOLOGIST: James D. Shotwell | DRILLER: Dusty Choate | DRILLING RIG TYPE: Failing 1000
DRILLING METHODS: Air Rotary | TOTAL DEPTH: 130 feet | HOLE DIAMETER: 6.75 inches
SITE COORDINATES: 247976.00' N + 790629.76' E | ELEVATIONS: GROUND: NA | PAD: 2519.47 | TOC: 2522.22 | PROT. CSG: 2522.47
WATER LEVEL: DEPTH: 116.36 Feet | DATUM: TOC | DATE: June 11, 1992 | TIME: 9:05 AM

JONES AND NEUSE, INC.
Environmental and Engineering Consultants

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION
100				SP		SAND as above, becoming moist.
						SATURTATION @ 101 FEET
				SP		GRAVELLY SAND uniform fine grained, loose, red, saturated with <5% GRAVEL fine, loose, calcareous, cherty, dark gray.
110				SP		SAND uniform, fine grained, loose, red, saturated.
120				SP		SAND as above.
130				SP		SAND as above.
						Boring terminated at 130 feet below grade.
140						
150						
160						
170						
180						
190						
200						

COMPLETION DATA

MATERIAL SETTING

BELOW GRADE MATERIAL COMPLETIONS CONTINUED FROM PREVIOUS PAGE

100
110 — Filter Pack Sand; 0.02" PVC Mill Slot Scrn.
120 — Screen set @ 120'
130
140
150
160
170
180
190
200

(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MW-P2-SC.WK3

MONITOR WELL CONSTRUCTION

WELL NO. MW-76A

CLIENT: FINA OIL & CHEMICAL COMPANY JOB NO: 019505.1 SHEET 1 OF 2

SITE: BIG SPRING, TEXAS DATE: START: June 5, 1992 FINISH: June 5, 1992

GEOLOGIST: James D. Shotwell DRILLER: Dusty Choate DRILLING RIG TYPE: Failing 1000

DRILLING METHODS: Air Rotary TOTAL DEPTH: 180 feet HOLE DIAMETER: 6.75 inches

SITE COORDINATES: 247974.81' N + 790620.73' E ELEVATIONS: GROUND: NA PAD: 2519.14 TOC: 2521.89 PROT. CSG: 2522.14

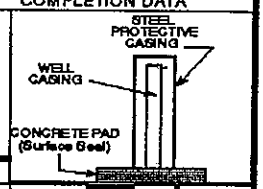
WATER LEVEL: DEPTH: 112.69 Feet DATUM: TOC DATE: June 12, 1992 TIME: 9:05 AM

JONES AND NEUSE, INC.
Environmental and Engineering Consultants

LITHOLOGIC DESCRIPTION

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	
0				SP		SAND uniform, fine grained, loose, red, moist.
10				SP		SAND as above.
20				SP		SAND as above.
30				SP		SAND as above.
40				SP		SAND as above, dry.
50				SP		GRAVELLY SAND uniform, fine grained, loose, red, dry, with <2% GRAVEL fine, loose, calcareous, cherty, off-white, dry.
60				SP		SAND uniform, fine grained, red, dry.
70				SP		SAND as above.
80				SP		SAND as above.
90				SP		SAND as above.
100				SP		SAND as above, becoming damp.

COMPLETION DATA



MATERIAL SETTINGS		
0		
20	Cemt. Bent. Grout	2" Sch 40 PVC Cas.
80	Cemt. Bent. Grout	2" Sch 40 PVC Cas.

(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MW-STAND.WK3

MONITOR WELL CONSTRUCTION

WELL NO. MW-76A

CLIENT: FINA OIL & CHEMICAL COMPANY JOB NO: 019505.1 SHEET 2 OF 2

SITE: BIG SPRING, TEXAS DATE: START: June 5, 1992 FINISH: June 5, 1992

GEOLOGIST: James D. Shotwell DRILLER: Dusty Choate DRILLING RIG TYPE: Failing 1000

DRILLING METHODS: Air Rotary TOTAL DEPTH: 180 feet HOLE DIAMETER: 6.75 inches

SITE COORDINATES: 247974.81' N + 790620.73' E ELEVATIONS: GROUND: NA PAD: 2519.14 TOC: 2521.89 PROT. CSG: 2522.14

WATER LEVEL: DEPTH: 112.69 Feet DATUM: TOC DATE: June 12, 1992 TIME: 9:05 AM

JONES AND NEUSE, INC.
Environmental and Engineering Consultants

LITHOLOGIC DESCRIPTION

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION
100				SP		SAND as above, becoming moist.
						SATURTATION @ 101 FEET
				SP		GRAVELLY SAND uniform fine grained, loose, red, saturated with <5% GRAVEL fine, loose, calcareous, cherty, dark gray.
110				SP		SAND uniform, fine grained, loose, red, saturated.
120				SP		SAND as above.
130				SP		SAND as above.
140				SP		SAND as above.
				SP		GRAVELLY SAND uniform, fine grained, loose, red, saturated, with 10% coarse sand and caliche GRAVEL fine, loose, white to off-wh.
150				SP		GRAVELLY SAND as above.
160				CH		TOP DOCKUM CLAY highly plastic, hard,red, dry.
				CH		CLAY as above.
170				CH		CLAY as above.
180				CH		CLAY as above.
						Boring terminated at 180 feet below grade.
190						
200						

COMPLETION DATA

MATERIAL SETTING

BELOW GRADE MATERIAL COMPLETIONS CONTINUED FROM PREVIOUS PAGE

100
110 — Bent. Seal
120 — Base Seal @ 127'
130
140 — Filter Pack Sand
150
160
170
180
190
200

2" Sch 40 Pvc Cas.

0.020" PVC Mill Slot Scrn.

(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MW-P2-SC.WK3

MONITOR WELL CONSTRUCTION

WELL NO. MW-77

CLIENT: FINA OIL & CHEMICAL COMPANY JOB NO: 019505.1 SHEET 1 OF 2

SITE: BIG SPRING, TEXAS DATE: START: June 6, 1992 FINISH: June 6, 1992

GEOLOGIST: James D. Shotwell DRILLER: Dusty Choate DRILLING RIG TYPE: Failing 1000

DRILLING METHODS: Air Rotary TOTAL DEPTH: 130 feet HOLE DIAMETER: 6.75 inches

SITE COORDINATES: 247474.47' N + 790109.49' E ELEVATIONS: GROUND: NA PAD: 2508.82 TOC: 2511.60 PROT. CSG: 2511.82

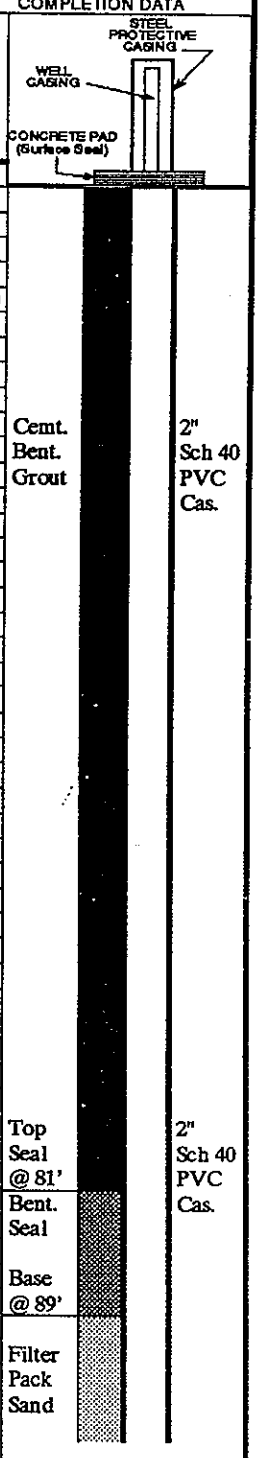
WATER LEVEL: DEPTH: 106.94 Feet DATUM: TOC DATE: June 18, 1992 TIME: 8:30 AM

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION
0				SP		SAND uniform, fine grained, loose to slightly compacted, red, damp.
10				SP		SAND uniform, fine grained, loose, red, damp.
20				SP		SAND as above.
30				SP		SAND as above.
40				SP		SAND as above.
50				SP		GRAVELLY SAND uniform, fine grained, loose, red, dry, with 5% caliche GRAVEL fine, loose, calcareous, cherty, white.
				SP		SAND uniform, fine grained, loose, red, dry.
60				SP		SAND as above.
70				SP		SAND as above.
80				SP		SAND as above.
90				SP		GRAVELLY SAND uniform, fine grained, loose, red, dry, with 5% caliche GRAVEL medium, loose, calcareous, cherty, white.
100						

JONES AND NEUSE, INC. Environmental and Engineering Consultants

(continued on page 2)

COMPLETION DATA



(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MW-STAND.WK3

MONITOR WELL CONSTRUCTION

CLIENT: FINA OIL & CHEMICAL COMPANY JOB NO: 019505.1 WELL NO. MW-77
SITE: BIG SPRING, TEXAS DATE: START: June 6, 1992 SHEET 2 OF 2 FINISH: June 6, 1992
GEOLOGIST: James D. Shotwell DRILLER: Dusty Choate DRILLING RIG TYPE: Failing 1000
DRILLING METHODS: Air Rotary TOTAL DEPTH: 130 feet HOLE DIAMETER: 6.75 inches
SITE COORDINATES: 247474.47' N + 790109.49' E ELEVATIONS: GROUND: NA PAD: 2508.82 TOC: 2511.60 PROT. CSG: 2511.82
WATER LEVEL: DEPTH: 106.94 Feet DATUM: TOC DATE: June 18, 1992 TIME: 8:30 AM

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION
100				SP		SAND uniform, fine grained, loose, red, moist.
						SATURATION @ 101 FEET
110				SP		SAND as above, saturated.
120				SP		SAND as above.
130				SP		SAND as above.
						Boring terminated at 130 feet below grade.

JONES AND NEUSE, INC.
Environmental and Engineering Consultants

COMPLETION DATA

MATERIAL SETTINGS

BELOW GRADE MATERIAL COMPLETIONS CONTINUED FROM PREVIOUS PAGE

Filter Pack Sand

0.020" PVC Mill Slot Scrn.

(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MW-P2-SC.WK3

MONITOR WELL CONSTRUCTION

CLIENT: FINA OIL & CHEMICAL COMPANY JOB NO: 019505.1 WELL NO. MW-77A
SITE: BIG SPRING, TEXAS DATE: START: June 5, 1992 SHEET 1 OF 2 FINISH: June 6, 1992
GEOLOGIST: James D. Shotwell DRILLER: Dusty Choate DRILLING RIG TYPE: Failing 1000
DRILLING METHODS: Air Rotary TOTAL DEPTH: 160 feet HOLE DIAMETER: 6.75 inches
SITE COORDINATES: 247481.83' N + 790113.43' E ELEVATIONS: GROUND: NA PAD: 2509.09 TOC: 2511.89 PROT. CSG: 2512.09
WATER LEVEL: DEPTH: 102.44 Feet DATUM: TOC DATE: June 18, 1992 TIME: 8:30 AM

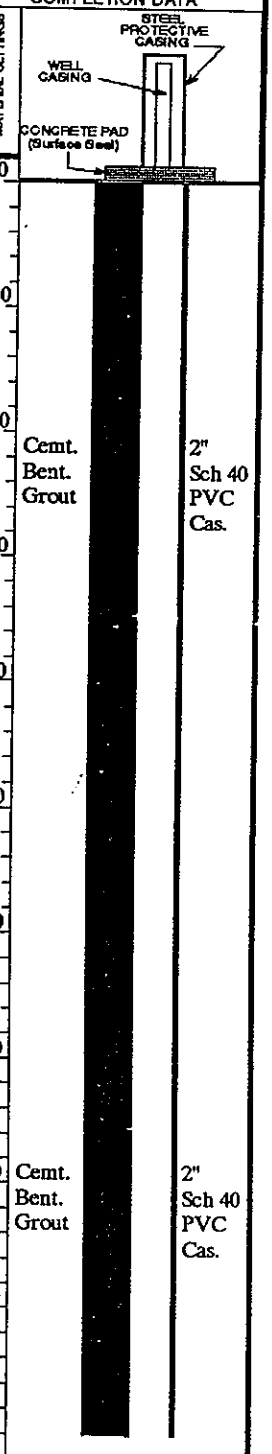
JONES AND NEUSE, INC.
Environmental and Engineering Consultants

LITHOLOGIC DESCRIPTION

DEPTH (FEET)	USCS SYMBOL (1)	
0	SP	SAND uniform, fine grained, loose to slightly compacted, red, damp.
10	SP	SAND uniform, fine grained, loose, red, damp.
20	SP	SAND as above.
30	SP	SAND as above.
40	SP	SAND as above.
50	SP	GRAVELLY SAND uniform, fine grained, loose, red, dry, with 5% caliche GRAVEL fine, loose, calcareous, cherty, white.
	SP	SAND uniform, fine grained, loose, red, dry.
60	SP	SAND as above.
70	SP	SAND as above.
80	SP	SAND as above.
90	SP	GRAVELLY SAND uniform, fine grained, loose, red, dry, with 5% caliche GRAVEL medium, loose, calcareous, cherty, white.
100		

(continued on page 2)

COMPLETION DATA



(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MW-STAND.WK3

MONITOR WELL CONSTRUCTION

WELL NO. MW-77A

CLIENT: FINA OIL & CHEMICAL COMPANY JOB NO: 019505.1 SHEET 2 OF 2

SITE: BIG SPRING, TEXAS DATE: START: June 5, 1992 FINISH: June 6, 1992

GEOLOGIST: James D. Shotwell DRILLER: Dusty Choate DRILLING RIG TYPE: Failing 1000

DRILLING METHODS: Air Rotary TOTAL DEPTH: 160 feet HOLE DIAMETER: 6.75 inches

SITE COORDINATES: 247481.83' N + 790113.43' E ELEVATIONS: GROUND: NA PAD: 2509.09 TOC: 2511.89 PROT. CSG: 2512.09

WATER LEVEL: DEPTH: 102.44 Feet DATUM: TOC DATE: June 18, 1992 TIME: 8:30 AM

JONES AND NEUSE, INC.
Environmental and Engineering Consultants

LITHOLOGIC DESCRIPTION

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION
100						
	X			SP		SAND uniform, fine grained, loose, red, moist.
						SATURATION @ 101 FEET
110	X			SP		SAND as above, saturated.
120	X			SP		SAND as above.
130	X			SP		SAND as above.
140	X			CH		CLAY @ 139' highly plastic, dense, red, moist.
	X			SP		SAND uniform, fine grained, loose, red, saturated.
	X			SP		SAND as above.
150	X			SP		GRAVELLY SAND uniform, fine grained, loose, red, saturated, with 10% caliche GRAVEL fine, loose, calcareous, cherty, white.
	X			CH		TOP DOCKUM CLAY highly plastic, hard, red, dry.
160	X			CH		CLAY as above.
						Boring terminated at 160 feet below grade.
170						
180						
190						
200						

COMPLETION DATA

MATERIAL SETTINGS	BELOW GRADE MATERIAL COMPLETIONS CONTINUED FROM PREVIOUS PAGE
100	
110	Cemt. Bent. Grout — 2" Sch 40 PVC Cas.
120	Bent. Seal
130	Base Seal @ 127'
140	Filter Pack Sand — 0.020" PVC Mill Slot Scrn.
150	
160	
170	
180	
190	
200	

(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MW-P2-SC.WK3

MONITOR WELL CONSTRUCTION

WELL NO. MW–78

CLIENT: FINA OIL & CHEMICAL COMPANY JOB NO: 019505.1 SHEET 1 OF 1

SITE: BIG SPRING, TEXAS DATE: START: June 6, 1992 FINISH: June 6, 1992

GEOLOGIST: James D. Shotwell DRILLER: Dusty Choate DRILLING RIG TYPE: Failing 1000

DRILLING METHODS: Air Rotary TOTAL DEPTH: 65 feet HOLE DIAMETER: 6.75 inches

SITE COORDINATES: 237751.18' N + 791127.67' E ELEVATIONS: GROUND: NA PAD: 2415.95 TOC: 2418.59 PROT. CSG: 2418.90

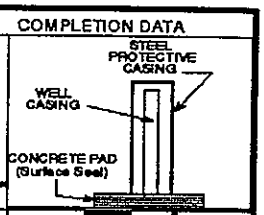
WATER LEVEL: DEPTH: 50.07 Feet DATUM: TOC DATE: June 20, 1992 TIME: 10:15 AM

JONES AND NEUSE, INC.
Environmental and Engineering Consultants

LITHOLOGIC DESCRIPTION

DEPTH (FEET)	USCS SYMBOL (1)		
0	SP	SAND	uniform, fine grained, moderately cemented with 25% calcareous cement, light red, dry.
10	SP	SAND	uniform, fine grained, loose, red, dry.
20	SP	SAND	as above.
30	SP	GRAVELLY SAND	uniform, fine grained, loose, red, dry with 5% caliche GRAVEL fine, loose, calcareous, cherty, off–white, dry
	SP	SAND	uniform, fine grained, loose, red, dry.
40	SP	SAND	as above. SATURATION @ 40 FEET
50	SP	GRAVELLY SAND	uniform, fine grained, loose, red, dry, with 10% caliche GRAVEL fine, loose, calcareous, cherty, white.
60	SP	GRAVELLY SAND	as above.
	CH	SILTY CLAY	slightly plastic, mod. hard, off–white, <5% SILT.
70		Boring terminated 65 feet below grade.	
80			
90			
100			

COMPLETION DATA



MATERIAL SETTINGS	
0	
10	Cemt. Bent. Grout
20	Top Seal @ 27'
30	Bent. Seal
40	Filter Pack Sand
50	
60	

2" Sch 40 PVC Cas.

Top Screen @ 39'

0.020" PVC Mill Slot Scrn.

Screen set @ 59'

(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MW–STAND.WK3

MONITOR WELL CONSTRUCTION

WELL NO. MW-78A

CLIENT: FINA OIL & CHEMICAL COMPANY JOB NO: 019505.1 SHEET 1 OF 1

SITE: BIG SPRING, TEXAS DATE: START: June 6, 1992 FINISH: June 6, 1992

GEOLOGIST: James D. Shotwell DRILLER: Dusty Choate DRILLING RIG TYPE: Failing 1000

DRILLING METHODS: Air Rotary TOTAL DEPTH: 90 feet HOLE DIAMETER: 6.75 inches

SITE COORDINATES: 237741.82' N + 791127.69' E ELEVATIONS: GROUND: NA PAD: 2416.19 TOC: 2418.85 PROT. CSG: 2419.04

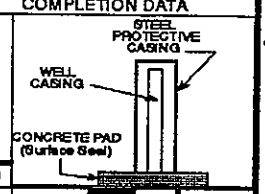
WATER LEVEL: DEPTH: 50.55 Feet DATUM: TOC DATE: June 20, 1992 TIME: 10:15 AM

JONES AND NEUSE, INC.
Environmental and Engineering Consultants

LITHOLOGIC DESCRIPTION

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION
0				SP		SAND uniform, fine grained, moderately cemented with 25% calcareous cement, light red, dry.
10				SP		SAND uniform, fine grained, loose, red, dry.
20				SP		SAND as above.
30				SP		GRAVELLY SAND uniform, fine grained, loose, red, dry with 5% caliche GRAVEL fine, loose, calcareous, cherty, off-white, dry.
				SP		SAND uniform, fine grained, loose, red, dry.
40				SP		SAND as above. SATURATION @ 40 FEET
50				SP		GRAVELLY SAND uniform, fine grained, loose, red, dry, with 10% caliche GRAVEL fine, loose, calcareous, cherty, white.
60				SP		GRAVELLY SAND as above.
				CH		SILTY CLAY slightly plastic, mod. hard, off-white, <5% SILT.
70				GP		GRAVEL uniform, coarse, subrounded quartzitic, cherty and calcareous pebbles
				GP		GRAVEL as above.
				CH		TOP DOCKUM CLAY highly plastic, hard, red, dry, strong odor.
80				CH		CLAY as above.
90				CH		CLAY as above.
100						Boring terminated at 90 below grade.

COMPLETION DATA



MATERIAL SETTINGS	
0	
10	
20	Cemt. Bent. Grout
30	
40	
50	Top Seal @ 55'
	Bent. Seal
60	Base @ 63'
70	Filter Pack Sand
80	
90	
100	

2" Sch 40 PVC Cas.

0.020" PVC Mill Slot Scrn.

(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MW-STAND.WK3

MONITOR WELL CONSTRUCTION

WELL NO. MW--79

CLIENT: FINA OIL & CHEMICAL COMPANY JOB NO: 019505.1 SHEET 1 OF 1

SITE: BIG SPRING, TEXAS DATE: START: June 7, 1992 FINISH: June 7, 1992

GEOLOGIST: James D. Shotwell DRILLER: Dusty Choate DRILLING RIG TYPE: Failing 1000

DRILLING METHODS: Air Rotary TOTAL DEPTH: 80 feet HOLE DIAMETER: 6.75 inches

SITE COORDINATES: 237967.67' N + 792296.12' E ELEVATIONS: GROUND: NA PAD: 2436.40 TOC: 2439.07 PROT. CSG: 2439.30

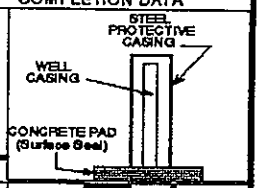
WATER LEVEL: DEPTH: 70.73 Feet DATUM: TOC DATE: June 21, 1992 TIME: 7:30 AM

JONES AND NEUSE, INC.
Environmental and Engineering Consultants

LITHOLOGIC DESCRIPTION

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION
0				SP		SAND uniform, very fine grained, poorly cemented with 5% calcareous cement, light tan, dry.
10				SP		SAND as above.
				SP		– becoming fine grained.
20				SP		SAND as above, becoming red.
				SP		SAND uniform, fine grained, loose, red, damp.
30				SP		SAND as above.
40				SP		SAND as above.
				SC		CLAYEY SAND uniform, very fine grained, mod. cemented, tan, damp, with 20% CLAY.
50				CL		SILTY CLAY moderately plastic, soft, tan, damp, with 10% SILT. SATURATION @ 52 FEET.
60				CL		SILTY CLAY as above, with slight odor.
70				SP		SAND uniform, fine grained, loose, red, saturated, odor.
80				SP		SAND as above.
						Boring terminated 80 feet below grade.
90						
100						

COMPLETION DATA



MATERIAL SETTINGS

0 – 10: Cemt. Bent. Grout

10 – 40: 2" Sch 40 PVC Cas.

40 – 41': Top Seal @ 41'

41' – 50: Bent. Seal

50 – 71': Top Screen @ 51'; 0.020" PVC Mill Slot Scrn.

50 – 71': Filter Pack Sand

Screen set @ 71'

(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MW--STAND.WK3

MONITOR WELL CONSTRUCTION

WELL NO. MW–79A

CLIENT: FINA OIL & CHEMICAL COMPANY JOB NO: 019505.1 SHEET 1 OF 2

SITE: BIG SPRING, TEXAS DATE: START: June 7, 1992 FINISH: June 7, 1992

GEOLOGIST: James D. Shotwell DRILLER: Dusty Choate DRILLING RIG TYPE: Failing 1000

DRILLING METHODS: Air Rotary TOTAL DEPTH: 120 feet HOLE DIAMETER: 6.75 inches

SITE COORDINATES: 237965.10' N + 792288.00' E ELEVATIONS: GROUND: NA PAD: 2436.07 TOC: 2438.74 PROT. CSG: 2438.97

WATER LEVEL: DEPTH: 70.31 Feet DATUM: TOC DATE: June 21, 1992 TIME: 7:30 AM

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION
0				SP		SAND uniform, very fine grained, poorly cemented with 5% calcareous cement, light tan, dry.
10				SP		SAND as above.
				SP		– becoming fine grained.
20				SP		SAND as above, becoming red.
				SP		SAND uniform, fine grained, loose, red, damp.
30				SP		SAND as above.
40				SP		SAND as above.
				SC		CLAYEY SAND uniform, very fine grained, mod. cemented, tan, damp, with 20% CLAY.
50				CL		SILTY CLAY moderately plastic, soft, tan, damp, with 10% SILT. SATURATION @ 52 FEET.
60				CL		SILTY CLAY as above, with slight odor.
70				SP		SAND uniform, fine grained, loose, red, saturated, odor.
80				SP		SAND as above.
90				SP		SAND as above.
				GP		SANDY GRAVEL gap graded, fine to coarse, subrounded quartz and limestone pebbles with 15% SAND uniform, fine grained, loose, red, saturated, odor.
100				SP		SAND uniform, medium grained, loose, red, saturated, odor.

(continued on page 2)

JONES AND NEUSE, INC.
Environmental and Engineering Consultants

COMPLETION DATA

MATERIAL SETTINGS	
0	STEEL PROTECTIVE CASING; WELL CASING; CONCRETE PAD (Surface Seal)
20	Cemt. Bent. Grout
	2" Sch 40 PVC Cas.
60	
	2" Sch 40 PVC Cas.
70	
80	Top Seal @ 81'
	Bent. Seal
90	Top Screen @ 91'
	Filter Pack Sand
100	0.020" Mill Slot Scrn.

(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MW–STAND.WK3

MONITOR WELL CONSTRUCTION

CLIENT: FINA OIL & CHEMICAL COMPANY | JOB NO: 019505.1 | WELL NO. MW-79A | SHEET 2 OF 2

SITE: BIG SPRING, TEXAS | DATE: START: June 7, 1992 | FINISH: June 7, 1992

GEOLOGIST: James D. Shotwell | DRILLER: Dusty Choate | DRILLING RIG TYPE: Failing 1000

DRILLING METHODS: Air Rotary | TOTAL DEPTH: 120 feet | HOLE DIAMETER: 6.75 inches

SITE COORDINATES: 237965.10' N + 792288.00' E | ELEVATIONS: GROUND: NA | PAD: 2436.07 | TOC: 2438.74 | PROT. CSG: 2438.97

WATER LEVEL: DEPTH: 70.31 Feet | DATUM: TOC | DATE: June 21, 1992 | TIME: 7:30 AM

JONES AND NEUSE, INC.
Environmental and Engineering Consultants

LITHOLOGIC DESCRIPTION

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION
100				GP		SANDY GRAVEL — gap graded, fine to medium, loose, quartz and limestone pebbles, saturated with 5% SAND, strong odor.
110				GP		SANDY GRAVEL — as above, strong odor.
				CH		TOP DOCKUM CLAY (@ 111') — highly plastic, hard, red, dry.
				CH		CLAY — as above.
120				CH		CLAY — as above.

Terminated soil boring at 120 feet below grade.

COMPLETION DATA

MATERIAL SETTINGS

BELOW GRADE MATERIAL COMPLETIONS CONTINUED FROM PREVIOUS PAGE

Filter Pack Sand

0.020" PVC Mill Slot Scrn.

Screen set @ 111'

(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MW-P2-SC.WK3

MONITOR WELL CONSTRUCTION

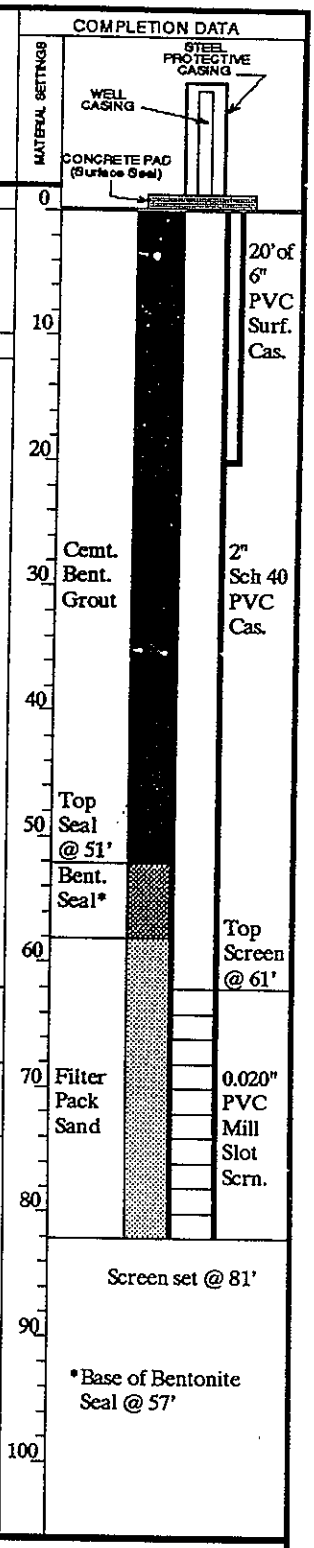
CLIENT: FINA OIL & CHEMICAL COMPANY JOB NO: 019505.1 WELL NO. MW-80
SITE: BIG SPRING, TEXAS DATE: START: June 8, 1992 SHEET 1 OF 2 FINISH: June 8, 1992
GEOLOGIST: James D. Shotwell DRILLER: Dusty Choate DRILLING RIG TYPE: Failing 1000
DRILLING METHODS: Air Rotary TOTAL DEPTH: 130 feet HOLE DIAMETER: 6.75 inches
SITE COORDINATES: 238485.73' N + 790471.29' E ELEVATIONS: GROUND: NA PAD: 2440.68 TOC: 2443.30 PROT. CSG: 2443.55
WATER LEVEL: DEPTH: 68.75 Feet DATUM: TOC DATE: June 21, 1992 TIME: 3:00 PM

JONES AND NEUSE, INC.
Environmental and Engineering Consultants

LITHOLOGIC DESCRIPTION

DEPTH (FEET)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION
0	SP	SAND	uniform, fine grained, loose, red, wet.
10	CH	WEATHERED CLAY	nonplastic, soft, light tan, damp.
	SP	SAND	uniform, fine grained, loose, red, moist.
20	SP	SAND	as above.
30	SP	SAND	as above, becoming dry.
40	SP	SAND	as above, dry.
50	SP	SAND	as above, dry.
	SP	SAND	uniform, fine to very fine grained, loose, red, dry.
60	SP	SAND	as above. TOP OF SATURATION @ 62 FEET, no odor.
	Ss	SANDSTONE	fg, mod. cemented, 10% calc. cement, lt. tan, weathered, saturated.
	Ss	SANDSTONE	fg–vfg, hard, well cem. w/ 25% calc cement, lt tan, unweathered, damp.
70	SP	CLAYEY GRAVELLY SAND	uniform, fine grained, loose, red, saturated, containing 5% CLAY and 10% GRAVEL coarse, loose, calcareous, cherty, light tan, no odor.
80	GP	GRAVEL	gap graded, coarse to fine, loose quartz and limestone pebbles, subrounded to rounded, with <5% fine SAND, odor.
	GP	GRAVEL	as above.
90	GP	GRAVEL	as above.
100			

(continued on page 2)



(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MW-STAND.WK3

MONITOR WELL CONSTRUCTION

CLIENT: FINA OIL & CHEMICAL COMPANY JOB NO: 019505.1 WELL NO. MW-80
SITE: BIG SPRING, TEXAS DATE: START: June 8, 1992 SHEET 2 OF 2 FINISH: June 8, 1992
GEOLOGIST: James D. Shotwell DRILLER: Dusty Choate DRILLING RIG TYPE: Failing 1000
DRILLING METHODS: Air Rotary TOTAL DEPTH: 130 feet HOLE DIAMETER: 6.75 inches
SITE COORDINATES: 238485.73' N + 790471.29' E ELEVATIONS: GROUND: NA PAD: 2440.68 TOC: 2443.30 PROT. CSG: 2443.55
WATER LEVEL: DEPTH: 68.75 Feet DATUM: TOC DATE: June 21, 1992 TIME: 3:00 PM

JONES AND NEUSE, INC.
Environmental and Engineering Consultants

LITHOLOGIC DESCRIPTION

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION
100				GP		GRAVEL as above.
110				GP		GRAVEL uniform, fine, loose, quartz and limestone pebbles, with <5% fine SAND, saturated, odor.
				GP		GRAVEL as above.
120				CH		TOP DOCKUM CLAY highly plastic, hard, red, dry.
130				CH		CLAY as above.

Boring terminated at 130 feet below grade.

NOTE: From 5 – 15 feet below grade, there were pieces of wood, styrofoam, particle board, paper, brick, etc. that were noted when reaming to total depth with the 6.75–inch drill bit.

COMPLETION DATA

MATERIAL SETTINGS

BELOW GRADE MATERIAL COMPLETIONS CONTINUED FROM PREVIOUS PAGE

(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MW-P2-SC.WK3

MONITOR WELL CONSTRUCTION

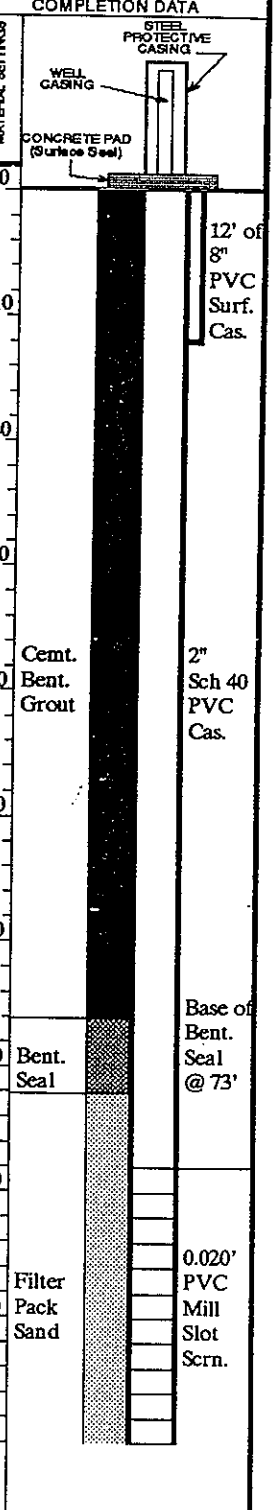
CLIENT: FINA OIL & CHEMICAL COMPANY JOB NO: 019505.1 WELL NO. MW-80A
SITE: BIG SPRING, TEXAS DATE: START: June 9, 1992 SHEET 1 OF 2 FINISH: June 9, 1992
GEOLOGIST: James D. Shotwell DRILLER: Dusty Choate DRILLING RIG TYPE: Failing 1000
DRILLING METHODS: Air Rotary TOTAL DEPTH: 120 feet HOLE DIAMETER: 6.75 inches
SITE COORDINATES: 238541.72' N + 790460.44' E ELEVATIONS: GROUND: NA PAD: 2439.91 TOC: 2442.71 PROT. CSG: 2443.27
WATER LEVEL: DEPTH: 66.35 Feet DATUM: TOC DATE: June 19, 1992 TIME: 3:05 PM

JONES AND NEUSE, INC.
Environmental and Engineering Consultants

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION
0				SP	SAND	uniform, fine grained, loose, red, damp.
10				SP	SAND	uniform, fine grained, loose, red, moist.
20				SP	SAND	as above.
30				SP	SAND	as above, dry.
40				SP	SAND	as above, dry.
50				SP	SAND	as above, dry.
60				SP	SAND	as above. TOP OF SATURATION @ 62 FEET.
70				SP	SAND	as above, saturated.
80				SC	CLAYEY SAND	uniform, fine grained, loose, red-tan, saturated, 10% CLAY.
90				SP	GRAVELLY SAND	uniform, fine grained, loose, red-tan, with 15% GRAVEL fine, loose, limestone and quartz pebbles, saturated.
100				SP	GRAVELLY SAND	as above, slight odor.

(continued on page 2)

COMPLETION DATA



(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MW-STAND.WK3

MONITOR WELL CONSTRUCTION

CLIENT: FINA OIL & CHEMICAL COMPANY JOB NO: 019505.1 WELL NO. MW-80A
SITE: BIG SPRING, TEXAS SHEET 2 OF 2
GEOLOGIST: James D. Shotwell DRILLER: Dusty Choate DATE: START: June 9, 1992 FINISH: June 9, 1992
DRILLING METHODS: Air Rotary DRILLING RIG TYPE: Failing 1000
SITE COORDINATES: 238541.72' N + 790460.44' E ELEVATIONS: GROUND: NA TOTAL DEPTH: 120 feet HOLE DIAMETER: 6.75 inches
WATER LEVEL: DEPTH: 66.35 Feet DATUM: TOC PAD: 2439.91 TOC: 2442.71 PROT. CSG: 2443.27
DATE: June 19, 1992 TIME: 3:05 PM

JONES AND NEUSE, INC.
Environmental and Engineering Consultants

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION
100				GP		GRAVEL as above.
110				CH		TOP DOCKUM CLAY highly plastic, hard, red, dry.
				CH		CLAY highly plastic, hard, red, dry.
120				CH		CLAY highly plastic, hard, red, dry.
						Boring terminated at 120 feet below grade.

COMPLETION DATA

MATERIAL GETTING IN

BELOW GRADE MATERIAL COMPLETIONS CONTINUED FROM PREVIOUS PAGE

Filter Pack Sand — 0.020" PVC Mill Slot Scrn.

(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MW-P2-SC.WK3

MONITOR WELL CONSTRUCTION

WELL NO. MW-109

CLIENT: FINA OIL & CHEMICAL COMPANY JOB NO: 019505.02 SHEET 1 OF 1

SITE: E.K. MORGAN RANCH – SOUTH BOUNDARY DATE: START: 02/18/93 FINISH: 02/18/93

GEOLOGIST: K. BECK DRILLER: D. CHOATE DRILLING RIG TYPE: FAILING 1000

DRILLING METHODS: AIR/WET ROTARY TOTAL DEPTH: 40 FEET HOLE DIAMETER: 7 7/8"

SITE COORDINATES: 236671.40'N / 791458.77'E ELEVATIONS: GROUND: N/A PAD: 2367.91' TOC: 2370.71' PROT. CSG: 2371.10'

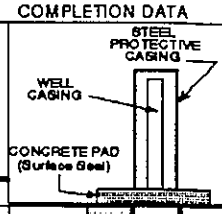
WATER LEVEL: DEPTH: 7.90 FEET DATUM: TOC DATE: 02/22/93 TIME: 20:16

JONES AND NEUSE, INC.
Environmental and Engineering Consultants

LITHOLOGIC DESCRIPTION

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	
0						
1	X			SP	SAND	– Uniform, brown, loose, moist, no odor.
3						
4	X					**SATURATION ENCOUNTERED AT 4'**
5	X			SP	SAND	– As above.
	X					
10	X			SP	SAND	– Uniform, fine grained, tan < 2% caliche gravel, no odor, shean appearing on water.
15	X			SP	SAND	– As above.
20	X			SP	SAND	– As above.
22						
25	X			SP	SAND	– As above.
26	X			GP	SANDY GRAVEL	– Coarse grained, subrounded, loose, with >20% fine SAND, chert, quartz.
30	X			CH	CLAY	– Highly plastic, orange to red, stiff, damp, staurated, DOCKUM CLAY @ 30 feet.
35	X			CH	CLAY	– As above.
40	X			CH	CLAY	– As above.
45						**BORING TERMINATED 40 FEET BELOW GRADE**
50						

COMPLETION DATA



MATERIAL SETTINGS	
0	
1	> Centr.
3	
5	
10	Filter Pack Sand
10	0.020" Mill Slot Scrn.
15	
20	
22	
25	> Sand–point
30	
35	
40	
45	
50	

(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MW-109.WK3

MONITOR WELL CONSTRUCTION

WELL NO. MW-109A

CLIENT: FINA OIL & CHEMICAL COMPANY | JOB NO: 019505.02 | SHEET 1 OF 1

SITE: E.K. MORGAN RANCH – SOUTH BOUNDARY | DATE: START: 02/18/93 | FINISH: 02/18/93

GEOLOGIST: K. BECK | DRILLER: D. CHOATE | DRILLING RIG TYPE: FAILING 1000

DRILLING METHODS: AIR/WET ROTARY | TOTAL DEPTH: 35 FEET | HOLE DIAMETER: 7 7/8"

SITE COORDINATES: 236684.80'N / 791463.31'E | ELEVATIONS: GROUND: N/A | PAD: 2367.71' | TOC: 2370.47' | PROT. CSG: 2370.85'

WATER LEVEL: DEPTH: 8.60 FEET | DATUM: TOC | DATE: 02/22/93 | TIME: 20:10

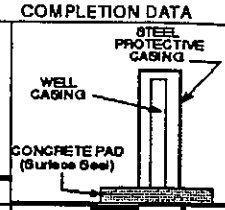
JONES AND NEUSE, INC.
Environmental and Engineering Consultants

LITHOLOGIC DESCRIPTION

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION
0						
	X			SP	SAND	– Uniform, fine grained, loose, brown, moist, no odor.
4	X			SP	SAND	– As above, fine grained, tan, SATURATED slight odor.
5	X			SP	SAND	– As above.
	X					
10	X			SP	SAND	– As above.
11	X			SM	SILTY SAND	– Gap graded, 50% subrounded sand, loose, soft, tan–gray, medium dense, gray–tan, odor.
15	X			SP	SAND	– Uniform, loose, tan, saturated, < 2% GRAVEL.
20	X			GC	SANDY GRAVEL	– Coarse grained, angular, <20% fine SAND, brown to gray, chert, quartz.
24	X			CH	CLAY	– Highly plastic, orange–red, stiff, DOCKUM CLAY @ 24 FEET.
25	X					
	X			CH	CLAY	– As above.
30	X			CH	CLAY	– As above.
35	X			CH	CLAY	– As above.
40						
45						
50						

BORING TERMINATED 35 FEET BELOW GRADE.

COMPLETION DATA



MATERIAL SETTINGS		
0		
	Cemnt. Bent. Grout	2" Sch 40 PVC Cas.
5		
8		
	Bent. Seal	
10		> Centr.
14		
15	Filter Pack Sand	0.020" Mill Slot Scrn.
20		
24		
25		> Sand – Point
30		
35		

(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MW-109A.WK3

MONITOR WELL CONSTRUCTION

WELL NO. MW–125

CLIENT: FINA OIL AND CHEMICAL COMPANY JOB NO: 019505.02 SHEET 1 OF 1

SITE: SOUTH BOUNDARY – PHASE III DATE: START: 30 Nov 93 FINISH: 30 Nov 93

GEOLOGIST: James D. Shotwell DRILLER: Dusty Choate DRILLING RIG TYPE: Failing 1000

DRILLING METHODS: Air Rotary TOTAL DEPTH: 100 feet HOLE DIAMETER: 6.75–inches

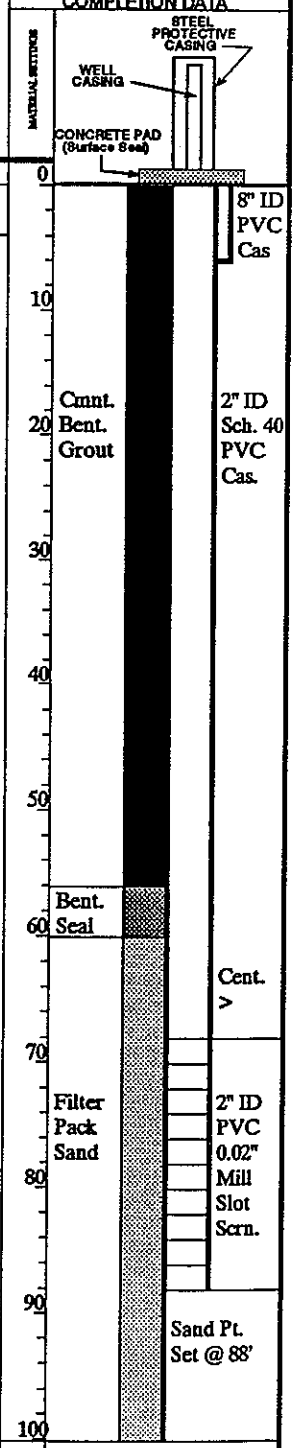
SITE COORDINATES: 238434.65' N and 789189.29' E ELEVATIONS: GROUND: 2437.81' PAD: 2438.31' TOC: 2440.98' PROT. CSG: 2441.36'

WATER LEVEL: DEPTH: 69.59' DATUM: TOC DATE: 3 Dec 93 TIME: 1242

JONES AND NEUSE, INC.
Environmental and Engineering Consultants

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION
0				Ss	CALICHE	very fine, well cemeted, hard, siliceous and calcareous, white, dry.
				SP	SAND	unifrom, fine, loose, tan–red, dry, no odor.
10				SP	SAND	as above, becoming very fine.
20				SP	SAND	as above.
30				SP	SAND	as above.
40				SP	SAND	as above.
50				SP	SAND	as above.
				SP	SAND	as above, becoming red.
60				SP	SAND	as above, red, no odor.
				SP	SAND	as above, becoming damp.
				SP	SAND	as above, becoming moist.
70						SATURATION @ 69 FEET, no odor.
80				SP	SAND	as above, saturated.
				SP	SAND	as above, slight septic odor.
				GP	GRAVEL	loose, fine to coarse, various colors, limestone and quartz, saturated, no odor, <2% fines and Sand.
90				CH	CLAY	highly plastic, hard, red, damp.
100				CH	CLAY	as above.
						Boring terminated at 100 feet below grade.

COMPLETION DATA



(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MONITOR WELL CONSTRUCTION

WELL NO. MW-125A

CLIENT: FINA OIL AND CHEMICAL COMPANY JOB NO: 019505.02 SHEET 1 OF 1

SITE: SOUTH BOUNDARY – PHASE III DATE: START: 30 Nov 93 FINISH: 30 Nov 93

GEOLOGIST: James D. Shotwell DRILLER: Dusty Choate DRILLING RIG TYPE: Failing 1000

DRILLING METHODS: Air Rotary TOTAL DEPTH: 100 feet HOLE DIAMETER: 6.75–inches

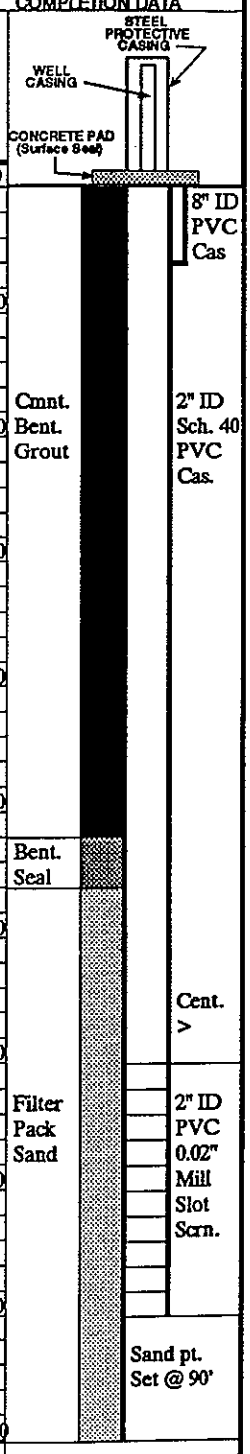
SITE COORDINATES: 238427.68' N and 789195.27' E ELEVATIONS: GROUND: 2437.71' PAD: 2438.21' TOC: 2440.81' PROT. CSG: 2441.22'

WATER LEVEL: DEPTH: 68.78' DATUM: TOC DATE: 3 Dec 93 TIME: 1242

JONES AND NEUSE, INC.
Environmental and Engineering Consultants

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION
0				Ss		CALICHE very fine, well cemeted, hard, siliceous and calcareous, white, dry.
				SP		SAND unifrom, fine, loose, tan–red, dry, no odor.
10				SP		SAND as above, becoming very fine.
20				SP		SAND as above.
30				SP		SAND as above.
40				SP		SAND as above.
50				SP		SAND as above.
				SP		SAND as above, becoming red.
60				SP		SAND as above, red, no odor.
				SP		SAND as above, becoming damp.
				SP		SAND as above, becoming moist.
70						SATURATION @ 69 FEET, no odor.
80				SP		SAND as above, saturated.
				SP		SAND as above, slight septic odor.
90				GP		GRAVEL loose, fine to coarse, various colors, limestone and quartz, saturated, no odor, <2% fines and Sand.
				CH		CLAY highly plastic, hard, red, damp.
100				CH		CLAY as above.
						Boring terminated at 100 feet below grade.

COMPLETION DATA



(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MONITOR WELL CONSTRUCTION

WELL NO. IW-149

CLIENT: Fina Oil and Chemical Company JOB NO: 019505.02 SHEET 1 OF 2

SITE: Big Spring Refinery DATE: START: 3-15-94 FINISH: 3-15-94

GEOLOGIST: Brad Stokes DRILLER: Choate Well Service DRILLING RIG TYPE: Failing 1000

DRILLING METHODS: Air / Wet Rotary TOTAL DEPTH: 120 Feet HOLE DIAMETER: 6.75 Inch

SITE COORDINATES: N 239410.09, E 794536.76 ELEVATIONS: GROUND: NA PAD: 2437.25 TOC: 2440.17 PROT. CSG: 2440.72

WATER LEVEL: DEPTH: DATUM: DATE: TIME:

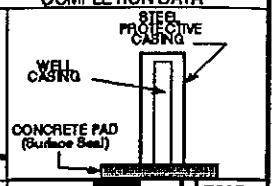
JONES AND NEUSE, INC.
Environmental and Engineering Consultants

LITHOLOGIC DESCRIPTION

DEPTH (FEET)	USCS SYMBOL (1)	LITHOLOGIC DESCRIPTION
0	SM	SILTY SAND –very fine to fine grained quartz sand, with 25 to 35% silt in matrix, dry to damp, compact, brown color, no odor
		–caliche below 4 feet, very light tan to white, lightly cemented to uncemented, dry, gradually diminishes.
10	SM	SILTY SAND –similar to above.
		–reddish brown color below 15 feet
20	SM	SILTY SAND –similar to above
30	SM	SILTY SAND –similar to above.
40	SM	SILTY SAND –similar to above.
50	SM	SILTY SAND –similar to above.
60	SM	SILTY SAND –similar to above, except saturated below 60 feet, phenolic odor
		–with occasional sandstone seams below 65 feet
70	SM	SILTY SAND –similar to above.
80	SM	SILTY SAND –similar to above.
90	GW	SANDY GRAVEL well rounded, pebble to cobble sized, quartz, chert and limestone gravel, with 30% coarse to medium quartz sand, compact, multicolored, saturated
100	CH	SILTY CLAY –moderate to high plasticity, firm to stiff, with 15 to 25% silt in matrix, brick red color, with occassional inclusion of light gray clay, DOCKUM FM.

(continued on Sheet 2)

COMPLETION DATA



MATERIAL SETTINGS	
0	PVC Surface Casing
5	
	Cement & Bent. Grout
47	Bent.
52	
59	2 Inch Diam. 0.010 inch Mill slot PVC Screen
	8/16 Filter Pack Sand
79	
98	

(1) UNIFIED SOIL CLASSIFICATION SYSTEM

REC-SC.WK3

MONITOR WELL CONSTRUCTION

WELL NO. IW-149

CLIENT: Fina Oil and Chemical Company JOB NO: 019505.02 SHEET 2 OF 2

SITE: Big Spring Refinery DATE: START: 3-15-94 FINISH: 3-15-94

GEOLOGIST: Brad Stokes DRILLER: Choate Well Service DRILLING RIG TYPE: Failing 1000

DRILLING METHODS: Air / Wet Rotary TOTAL DEPTH: 120 Feet HOLE DIAMETER: 6.75 Inch

SITE COORDINATES: N 239410.09, E 794536.76 ELEVATIONS: GROUND: NA PAD: 2437.25 TOC: 2440.17 PROT. CSG: 2440.72

WATER LEVEL: DEPTH: DATUM: DATE: TIME:

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION	MATERIAL SETTINGS	COMPLETION DATA
100				CH		SILTY CLAY –similar to above		BELOW GRADE MATERIAL COMPLETIONS CONTINUED FROM PREVIOUS PAGE
110								
120							120	
						BORING TERMINATED AT 120.0 FEET BELOW GRADE		
130								
140								
150								
160								
170								
180								
190								
200								

JONES AND NEUSE, INC. Environmental and Engineering Consultants

(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MW-P2-SC.WK3

MONITOR WELL CONSTRUCTION

WELL NO. IW-149A

CLIENT: Fina Oil and Chemical Company JOB NO: 019505.02 SHEET 1 OF 2

SITE: Big Spring Refinery DATE: START: 3-17-94 FINISH: 3-17-94

GEOLOGIST: Brad Stokes DRILLER: Choate Well Service DRILLING RIG TYPE: Failing 1000

DRILLING METHODS: Air / Wet Rotary TOTAL DEPTH: 110 Feet HOLE DIAMETER: 6.75 Inch

SITE COORDINATES: N 239422.04, E 794537.69 ELEVATIONS: GROUND: NA PAD: 2437.24 TOC: 2440.23 PROT. CSG: 2440.78

WATER LEVEL: DEPTH: DATUM: DATE: TIME:

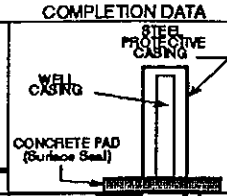
JONES AND NEUSE, INC.
Environmental and Engineering Consultants

LITHOLOGIC DESCRIPTION

DEPTH (FEET)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION
0	SM	SILTY SAND	–very fine to fine grained quartz sand, with 25 to 35% silt in matrix, dry to slightly damp, compact, brown color, no odor –caliche below 4 feet, very light tan to white, lightly cemented to uncemented, dry, gradually diminishes to 10 feet
10	SM	SILTY SAND	–similar to above. –light reddish tan color below 15 feet
20	SM	SILTY SAND	–similar to above
30	SM	SILTY SAND	–similar to above.
40	SM	SILTY SAND	–similar to above.
50	SM	SILTY SAND	–similar to above.
60	SM	SILTY SAND	–similar to above, except saturated below 60 feet, phenolic odor
70	SM	SILTY SAND	–similar to above.
80	SM	SILTY SAND	–similar to above. –brick red sand and sandstone below 82 feet, "false Red–Bed"
90	GW	SANDY GRAVEL	well rounded, pebble to cobble sized, quartz, chert and limestone gravel, with 15 to 30% coarse to medium quartz sand, compact, multicolored, saturated
100	CH	SILTY CLAY	–moderate to high plasticity, firm to stiff, with 15 to 25% silt in matrix, brick red color, with occassional inclusion of light gray clay, DOCKUM FM.

(continued on Sheet 2)

COMPLETION DATA



MATERIAL SETTINGS	
0	PVC Surface Casing
5	
	Cement & Bent. Grout
	2 Inch Diam. PVC Casing
46	
	Bent.
53	
	8/16 Filter Pack Sand
85	
	2" Diam. 0.020" Mill slot PVC Screen
98	

(1) UNIFIED SOIL CLASSIFICATION SYSTEM

REC-8C.WK3

MONITOR WELL CONSTRUCTION

WELL NO. IW-149A

CLIENT: Fina Oil and Chemical Company JOB NO: 019505.02 SHEET 2 OF 2

SITE: Big Spring Refinery DATE: START: 3-17-94 FINISH: 3-17-94

GEOLOGIST: Brad Stokes DRILLER: Choate Well Service DRILLING RIG TYPE: Failing 1000

DRILLING METHODS: Air / Wet Rotary TOTAL DEPTH: 110 Feet HOLE DIAMETER: 6.75 Inch

SITE COORDINATES: N 239422.04, E 794537.69 ELEVATIONS: GROUND: NA PAD: 2437.24 TOC: 2440.23 PROT. CSG: 2440.78

WATER LEVEL: DEPTH: DATUM: DATE: TIME:

JONES AND NEUSE, INC.
Environmental and Engineering Consultants

LITHOLOGIC DESCRIPTION

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION	MATERIAL SETTINGS	COMPLETION DATA
100				CH		SILTY CLAY -similar to above		BELOW GRADE MATERIAL COMPLETIONS CONTINUED FROM PREVIOUS PAGE
110						BORING TERMINATED AT 110.0 FEET BELOW GRADE	110	
120							120	
130								
140								
150								
160								
170								
180								
190								
200								

(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MW-P2-SC.WK3

MONITOR WELL CONSTRUCTION

WELL NO. IW-150

CLIENT: Fina Oil and Chemical Company JOB NO: 019505.02 SHEET 1 OF 1

SITE: Big Spring Refinery DATE: START: 3-16-94 FINISH: 3-16-94

GEOLOGIST: Brad Stokes DRILLER: Choate Well Service DRILLING RIG TYPE: Failing 1000

DRILLING METHODS: Air Rotary TOTAL DEPTH: 60 Feet HOLE DIAMETER: 6.75 Inch

SITE COORDINATES: N 236496.47, E 794259.34 ELEVATIONS: GROUND: NA PAD: 2391.84 TOC: 2394.79 PROT. CSG: 2395.34

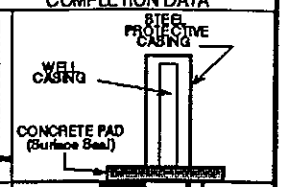
WATER LEVEL: DEPTH: DATUM: DATE: TIME:

JONES AND NEUSE, INC.
Environmental and Engineering Consultants

LITHOLOGIC DESCRIPTION

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION
0				SM		**SILTY SAND** –very fine grained quartz sand, with 25 to 35% silt in matrix, dry compact to loose, light tan color, some caliche gravel, no odor
10				SM		**SILTY SAND** –similar to above.
20				SM		–becomes brick–red colored below 18 feet **SILTY SAND** –similar to above, with occassional sandstone seam below 20 feet
30				SM		**SILTY SAND** –saturated below 28 feet, sand becomes fine to medium grained rounded quartz, with 15% silt, tan color, phenolic odor
40				GW		–hard sandstone at 37 feet **SANDY GRAVEL** well rounded quartz, chert and limestone gravel, granule to cobble sized, with 25 to 30% silty sand in matrix, compact
50				CH		**SILTY CLAY** –moderate to high plasticity, with 15 to 25% silt in matrix, brick–red color, firm to stiff, DOCKUM FM.
60						**BORING TERMINATED AT 60.0 FEET BELOW GRADE**
70						
80						
90						
100						

COMPLETION DATA



(1) UNIFIED SOIL CLASSIFICATION SYSTEM

REC–SC.WK3

MONITOR WELL CONSTRUCTION

WELL NO. IW-150A

CLIENT: Fina Oil and Chemical Company JOB NO: 019505.02 SHEET 1 OF 1

SITE: Big Spring Refinery DATE: START: 3-18-94 FINISH: 3-18-94

GEOLOGIST: Brad Stokes DRILLER: Choate Well Service DRILLING RIG TYPE: Failing 1000

DRILLING METHODS: Air Rotary TOTAL DEPTH: 60 Feet HOLE DIAMETER: 6.75 Inch

SITE COORDINATES: N 236473.16, E 794262.68 ELEVATIONS: GROUND: NA PAD: 2391.84 TOC: 2394.83 PROT. CSG: 2395.40

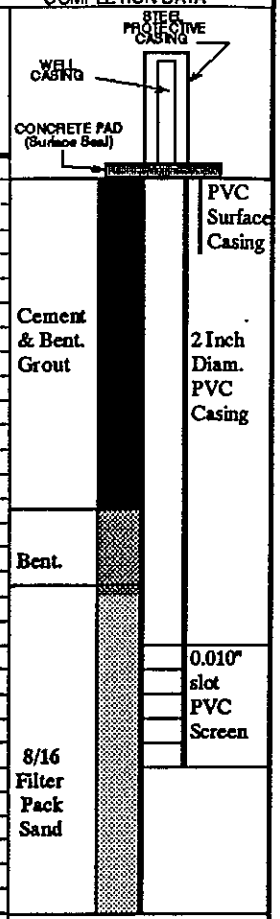
WATER LEVEL: DEPTH: DATUM: DATE: TIME:

JONES AND NEUSE, INC.
Environmental and Engineering Consultants

LITHOLOGIC DESCRIPTION

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION
0				SM		SILTY SAND –very fine grained quartz sand, with 25 to 35% silt in matrix, dry compact to loose, light tan color, some caliche gravel, no odor
10				SM		SILTY SAND –similar to above.
20				SM		–becomes brick–red colored below 18 feet SILTY SAND –similar to above, with occassional sandstone seam below 20 feet
30				SM		SILTY SAND –saturated below 28 feet, sand becomes fine to medium grained rounded quartz, with 15% silt, tan color, phenolic odor
40				GW		–hard sandstone at 37 feet SANDY GRAVEL well rounded quartz, chert and limestone gravel, granule to cobble sized, with 25 to 30% silty sand in matrix, compact
50				CH		–dark brown silty seam at 46 feet SILTY CLAY –moderate to high plasticity, with 15 to 25% silt in matrix, brick–red color, firm to stiff, DOCKUM FM.
60						BORING TERMINATED AT 60.0 FEET BELOW GRADE
70						
80						
90						
100						

COMPLETION DATA



(1) UNIFIED SOIL CLASSIFICATION SYSTEM

REC-SC.WK3

MONITOR WELL CONSTRUCTION

JONES & NEUSE
GULF COAST REGION OF RMT

WELL NO. MW-152

CLIENT: FINA OIL AND CHEMICAL COMPANY JOB NO: 019505.02 SHEET 1 OF 2

SITE: BIG SPRING, TEXAS DATE: START: 1145 June 22, 1994 FINISH: 1230 June 22, 1994

GEOLOGIST: James D. Shotwell DRILLER: Dusty Choate DRILLING RIG TYPE: Failing 1500

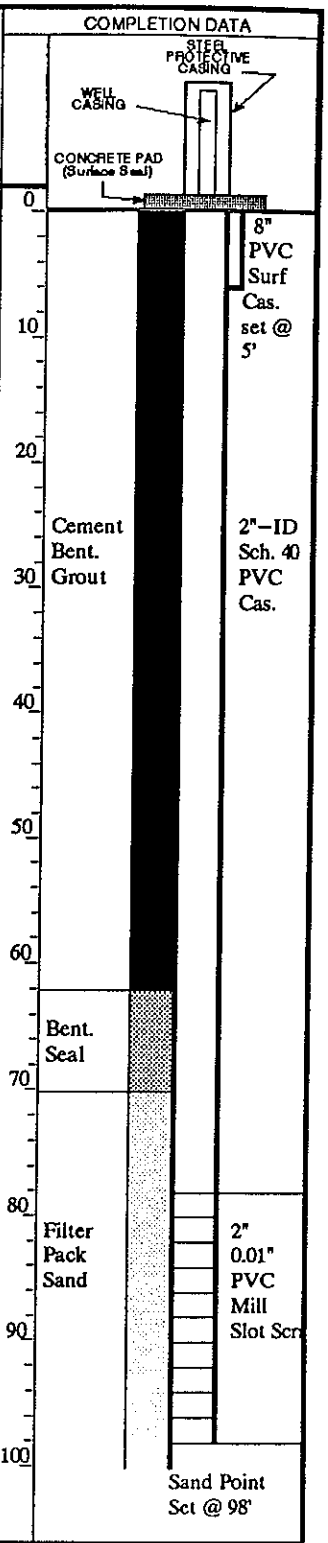
DRILLING METHODS: Air Rotary TOTAL DEPTH: 115 feet HOLE DIAMETER: 6.75 inches

SITE COORDINATES: 242601.34' N + 787822.22' E ELEVATIONS: GROUND: 2472.81 PAD: 2473.41 TOC: 2475.86 PROT. CSG: 2476.49

WATER LEVEL: DEPTH: DATUM: DATE: TIME:

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION
0				SP		SAND uniform, fine, loose, red, dry, no odor.
10				SP		SAND uniform, fine, loose, red, dry, no odor.
20				SP		SAND uniform, fine, loose, red, dry, no odor.
30				SP		SAND uniform, fine, loose, red, dry, no odor.
40				SP		SAND uniform, fine, loose, red, dry, no odor.
50				SP		SAND uniform, fine, loose, red, dry, no odor, with <5% calc. & silic. Gravel.
				SP		SAND uniform, fine, loose, red, dry, no odor, with <5% calc. & silic. Gravel.
				SP		SAND uniform, fine, loose, red, dry, no odor.
60				SP		SAND uniform, fine, loose, red, dry, no odor.
70				SP		SAND uniform, fine, loose, red, becoming damp, no odor.
80						SATURATION @ 79 feet below grade. slight odor.
				SP		SAND uniform, fine, loose, red, saturated, no odor,
90				SP		SAND uniform, fine, loose, red, saturated, no odor,
100						

(Continued on Page 2)



(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MONITOR WELL CONSTRUCTION

JONES & NEUSE
GULF COAST REGION OF RMT

WELL NO. MW-152

CLIENT: FINA OIL AND CHEMICAL COMPANY JOB NO: 019505.02 SHEET 2 OF 2

SITE: BIG SPRING, TEXAS DATE: START: 1145 June 22, 1994 FINISH: 1230 June 22, 1994

GEOLOGIST: James D. Shotwell DRILLER: Dusty Choate DRILLING RIG TYPE: Failing 1500

DRILLING METHODS: Air Rotary TOTAL DEPTH: 115 feet HOLE DIAMETER: 6.75 inches

SITE COORDINATES: 242601.34' N + 787822.22' E ELEVATIONS: GROUND: 2472.81 PAD: 2473.41 TOC: 2475.86 PROT. CSG: 2476.49

WATER LEVEL: DEPTH: DATUM: DATE: TIME:

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION	COMPLETION DATA: MATERIAL SETTINGS	COMPLETION DATA: BELOW GRADE MATERIAL COMPLETIONS CONTINUED FROM PREVIOUS PAGE
100							100	
				SP		SAND unifrom, fine, loose, red, saturated, slight odor.		
				SP		GRASVELLY SAND uniform, fine to very fine, loose, saturated with 25% fine Gravel, quartz, limestone and shell fragments, various colors, no odor.		Filter Pack Sand
110				GP		SANDY GRAVEL fine, loose, quartz, limestone, and shell fragments various colors with 10% fine Sand, no odor.	110	
120						Boring Terminated @ 115 Feet Below Grade	120	
130							130	
140							140	
150							150	
160							160	
170							170	
180							180	
190							190	
200							200	

(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MONITOR WELL CONSTRUCTION

JONES & NEUSE
GULF COAST REGION OF RMT

WELL NO. MW-152A

CLIENT: FINA OIL AND CHEMICAL COMPANY JOB NO: 019505.02 SHEET 1 OF 2

SITE: BIG SPRING, TEXAS DATE: START: 1605 June 21, 1994 FINISH: 0925 June 22, 1994

GEOLOGIST: James D. Shotwell DRILLER: Dusty Choate DRILLING RIG TYPE: Failing 1500

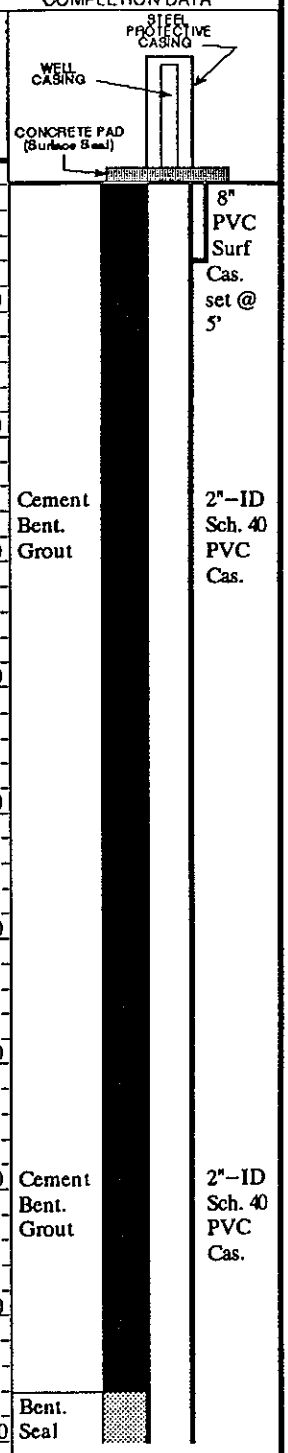
DRILLING METHODS: Air Rotary TOTAL DEPTH: 135 feet HOLE DIAMETER: 6.75 inches

SITE COORDINATES: 242600.51' N + 787811.18' E ELEVATIONS: GROUND: 2472.80 PAD: 2473.40 TOC: 2475.86 PROT. CSG: 2476.49

WATER LEVEL: DEPTH: DATUM: DATE: TIME:

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION
0				SP		SAND uniform, fine, loose, red, dry, no odor.
10				SP		SAND uniform, fine, loose, red, dry, no odor.
20				SP		SAND uniform, fine, loose, red, dry, no odor.
30				SP		SAND uniform, fine, loose, red, dry, no odor.
40				SP		SAND uniform, fine, loose, red, dry, no odor.
50				SP		SAND uniform, fine, loose, red, dry, no odor, with <5% calc. & silic. Gravel.
				SP		SAND uniform, fine, loose, red, dry, no odor, with <5% calc. & silic. Gravel.
				SP		SAND uniform, fine, loose, red, dry, no odor.
60				SP		SAND uniform, fine, loose, red, dry, no odor.
70				SP		SAND uniform, fine, loose, red, becoming damp, no odor.
80						SATURATION @ 79 feet below grade. slight odor.
				SP		SAND uniform, fine, loose, red, saturated, no odor,
90				SP		SAND uniform, fine, loose, red, saturated, no odor,
100						(Continued on Page 2)

COMPLETION DATA



(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MONITOR WELL CONSTRUCTION

JONES & NEUSE
GULF COAST REGION OF AMT

WELL NO. MW-152A
CLIENT: FINA OIL AND CHEMICAL COMPANY JOB NO: 019505.02 SHEET 2 OF 2
SITE: BIG SPRING, TEXAS DATE: START: 1605 June 21, 1994 FINISH: 0925 June 22, 1994
GEOLOGIST: James D. Shotwell DRILLER: Dusty Choate DRILLING RIG TYPE: Failing 1500
DRILLING METHODS: Air Rotary TOTAL DEPTH: 135 feet HOLE DIAMETER: 6.75 inches
SITE COORDINATES: 242600.51' N + 787811.18' E ELEVATIONS: GROUND: 2473.80 PAD: 2473.40 TOC: 2475.86 PROT. CSG: 2476.49
WATER LEVEL: DEPTH: DATUM: DATE: TIME:

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION
100				SP		SAND unifrom, fine, loose, red, saturated, slight odor.
				SP		GRASVELLY SAND uniform, fine to very fine, loose, saturated with 25% fine Gravel, quartz, limestone and shell fragments, various colors, no odor.
110				GP		SANDY GRAVEL fine, loose, quartz, limestone, and shell fragments various colors with 10% fine Sand, no odor.
				CH		CLAY highly plastic, hard, red-orange, damp.
120				CH		CLAY highly plastic, hard, red-orange, damp.
130				CH		CLAY highly plastic, hard, red-orange, damp.
				CH		CLAY highly plastic, hard, red-orange, damp.
140						Boring Terminated @ 135 Feet Below Grade
150						
160						
170						
180						
190						
200						

COMPLETION DATA

MATERIAL SETTINGS	BELOW GRADE MATERIAL COMPLETIONS CONTINUED FROM PREVIOUS PAGE
100	Bent. Seal
110	Filter Pack Sand
120	2 inch 0.01" Mill Slot PVC Scrn.
130	
140	Sand Point Set @ 116'
150	
160	
170	
180	
190	
200	

(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MONITOR WELL CONSTRUCTION

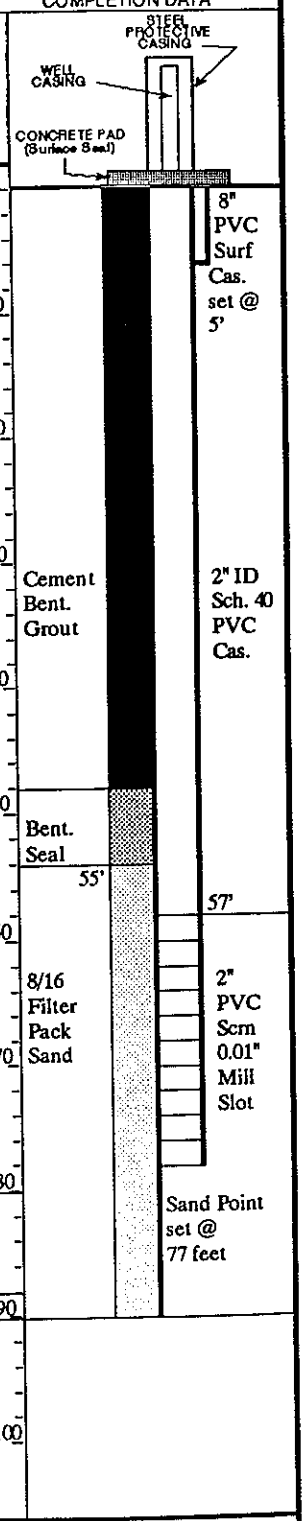
JONES & NEUSE
GULF COAST REGION OF RMT

WELL NO. MW-153
SHEET 1 OF 1

CLIENT: FINA OIL AND CHEMICAL COMPANY
JOB NO: 019505.02
SITE: BIG SPRING, TEXAS
DATE: START: 0910 June 23, 1994 FINISH: 0955 June 23, 1994
GEOLOGIST: James D. Shotwell
DRILLER: Dusty Choate
DRILLING RIG TYPE: Failing 1500
DRILLING METHODS: Air Rotary
TOTAL DEPTH: 90 feet
HOLE DIAMETER: 6.75 – inches
SITE COORDINATES: 242417.73' N + 786548.60' E
ELEVATIONS: GROUND: 2453.08 PAD: 2453.58 TOC: 2456.19 PROT. CSG: 2456.73
WATER LEVEL: DEPTH:
DATUM:
DATE:
TIME:

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION
0				SP		SAND uniform, fine to very fine, loose, red, dry.
10				SP		SAND uniform, fine to very fine, loose, red, dry.
20				SP		SAND uniform, fine to very fine, loose, red, dry.
30				SP		SAND uniform, fine to very fine, loose, red, dry.
40				SP		SAND uniform, fine to very fine, loose, red, dry.
50				SP		SAND uniform, fine to very fine, loose, red, dry.
				SP		SAND uniform, fine to very fine, loose, red, becoming damp.
60						SATURATION @ 58 feet below grade, no odor.
				SP		SAND as above, saturated.
70				SP		SAND as above.
80				GP		SANDY GRAVEL uniform, fine, loose, quartz, limestone, ans shell fragments, various colors, no odor with 5% very fine Sand.
90		87'		CH		CLAY (@87') highly plastic, hard, red–orange, damp.
						Boring terminated at 90 feet below grade.
100						

COMPLETION DATA



(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MW-ST-SC.WK3

MONITOR WELL CONSTRUCTION

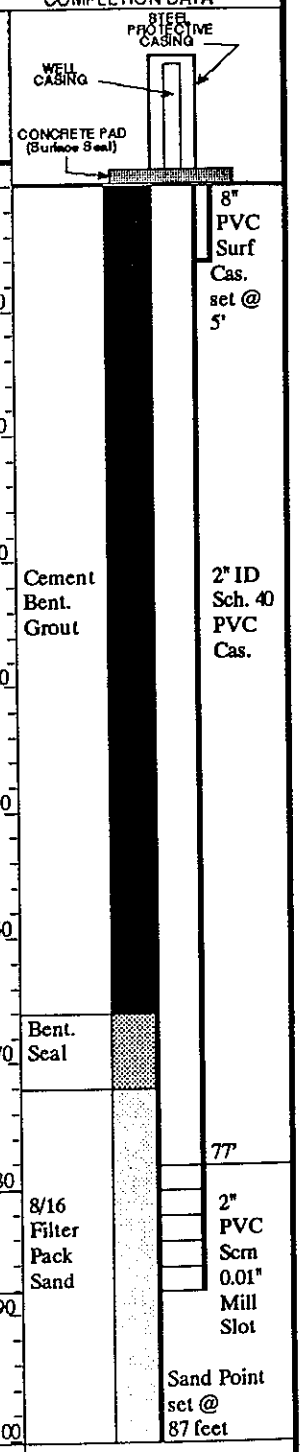
JONES & NEUSE
GULF COAST REGION OF RMT

WELL NO. MW-153A
SHEET 1 OF 1

CLIENT: FINA OIL AND CHEMICAL COMPANY
JOB NO: 019505.02
SITE: BIG SPRING, TEXAS
DATE: START: 1515 June 22, 1994 FINISH: 1605 June 22, 1994
GEOLOGIST: James D. Shotwell
DRILLER: Dusty Choate
DRILLING RIG TYPE: Failing 1500
DRILLING METHODS: Air Rotary
TOTAL DEPTH: 100 feet
HOLE DIAMETER: 6.75 – inches
SITE COORDINATES: 242.415.04' N + 786535.93' E
ELEVATIONS: GROUND: 2453.35 PAD: 2453.85 TOC: 2456.34 PROT. CSG: 2456.97
WATER LEVEL: DEPTH: DATUM: DATE: TIME:

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION
0				SP		SAND uniform, fine to very fine, loose, red, dry.
10				SP		SAND uniform, fine to very fine, loose, red, dry.
20				SP		SAND uniform, fine to very fine, loose, red, dry.
30				SP		SAND uniform, fine to very fine, loose, red, dry.
40				SP		SAND uniform, fine to very fine, loose, red, dry.
50				SP		SAND uniform, fine to very fine, loose, red, dry.
				SP		SAND uniform, fine to very fine, loose, red, becoming damp.
60						SATURATION @ 58 feet below grade, no odor.
				SP		SAND as above, saturated.
70				SP		SAND as above.
80				GP		SANDY GRAVEL uniform, fine, loose, quartz, limestone, ans shell fragments, various colors, no odor with 5% very fine Sand.
90		87'		CH		CLAY (@87') highly plastic, hard, red–orange, damp.
100				CH		CLAY as above.
						Boring terminated at 100 feet below grade.

COMPLETION DATA



(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MONITOR WELL CONSTRUCTION

JONES & NEUSE
GULF COAST REGION OF RMT

WELL NO. MW-154

CLIENT: FINA OIL AND CHEMICAL COMPANY JOB NO: 019505.02 SHEET 1 OF 2

SITE: BIG SPRING, TEXAS DATE: START: 1245 June 20, 1994 FINISH: 1435 June 20, 1994

GEOLOGIST: James D. Shotwell DRILLER: Dusty Choate DRILLING RIG TYPE: Failing 1500

DRILLING METHODS: Air Rotary TOTAL DEPTH: 120 feet HOLE DIAMETER: 6.75 – inches

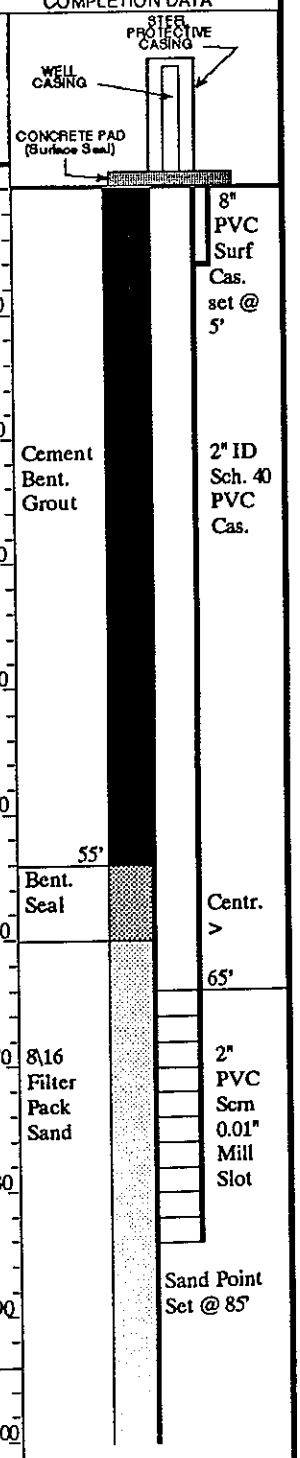
SITE COORDINATES: 240331.22' N + 787129.99' E ELEVATIONS: GROUND: 2448.60 PAD: 2449.10 TOC: 2451.56 PROT. CSG: 2452.19

WATER LEVEL: DEPTH: DATUM: DATE: TIME:

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION
0				SP		SAND uniform, fine, loose, red, dry, no odor, with <5% white caliche gravel.
10				SP		SAND as above, no gravel.
20				SP		SAND as above.
30				SP		SAND as above.
40				SP		SAND as above.
50				SP		SAND as above.
60				SP		SAND as above.
						SATURATION @ 66 feet below grade, odor.
70				SP		SAND as above, saturated, odor.
80				SP		SAND as above
90				SP		SAND as above, lightly cemented.
				GP		SANDY GRAVEL loose, gap graded, chert, limestone, quartz, various colors, saturated with strong gasoline odor.
100						

(Continued on Page 2)

COMPLETION DATA



(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MONITOR WELL CONSTRUCTION

JONES & NEUSE GULF COAST REGION OF RMT

WELL NO. MW-154

CLIENT: FINA OIL AND CHEMICAL COMPANY JOB NO: 019505.02 SHEET 2 OF 2

SITE: BIG SPRING, TEXAS DATE: START: 1245 June 20, 1994 FINISH: 1435 June 20, 1994

GEOLOGIST: James D. Shotwell DRILLER: Dusty Choate DRILLING RIG TYPE: Failing 1500

DRILLING METHODS: Air Rotary TOTAL DEPTH: 120 feet HOLE DIAMETER: 6.75 inches

SITE COORDINATES: 240331.22' N + 787129.99' E ELEVATIONS: GROUND: 2448.60 PAD: 2449.10 TOC: 2451.56 PROT. CSG: 2452.19

WATER LEVEL: DEPTH: DATUM: DATE: TIME:

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION	COMPLETION DATA: MATERIAL SETTINGS	COMPLETION DATA: BELOW GRADE MATERIAL COMPLETIONS CONTINUED FROM PREVIOUS PAGE
100							100	
				GP		SANDY GRAVEL as above.		
				CH		CLAY highly plastic, hard, orange-red, damp.		8\16 Filter Pack Sand
110				CH		CLAY as above.	110	
120				CH		CLAY as above.	120	
						Boring terminated @ 120 feet below grade.		
130							130	
140							140	
150							150	
160							160	
170							170	
180							180	
190							190	
200							200	

(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MW-PG2.WK3

MONITOR WELL CONSTRUCTION

JONES & NEUSE
GULF COAST REGION OF RMT

WELL NO. MW-154A

CLIENT: FINA OIL AND CHEMICAL COMPANY JOB NO: 019505.02 SHEET 1 OF 2

SITE: BIG SPRING, TEXAS DATE: START: 1239 June 21, 1994 FINISH: 1410 June 21, 1994

GEOLOGIST: James D. Shotwell DRILLER: Dusty Choate DRILLING RIG TYPE: Failing 1500

DRILLING METHODS: Air Rotary TOTAL DEPTH: 120 feet HOLE DIAMETER: 6.75 – inches

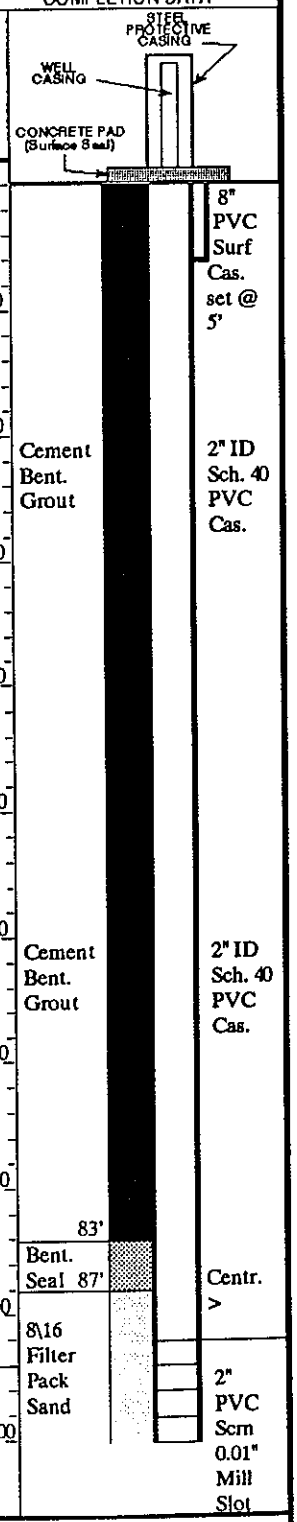
SITE COORDINATES: 240341.22' N + 787129.83' E ELEVATIONS: GROUND: 2448.61 PAD: 2449.11 TOC: 2451.58 PROT. CSG: 2452.21

WATER LEVEL: DEPTH: DATUM: DATE: TIME:

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION
0				SP		SAND uniform, fine, loose, red, dry, no odor, with <5% white caliche gravel.
10				SP		SAND as above, no gravel.
20				SP		SAND as above.
30				SP		SAND as above.
40				SP		SAND as above.
50				SP		SAND as above.
60				SP		SAND as above.
						SATURATION @ 66 feet below grade, odor.
70				SP		SAND as above, saturated, odor.
80				SP		SAND as above
90				SP		SAND as above, lightly cemented.
100				GP		SANDY GRAVEL loose, gap graded, chert, limestone, quartz, various colors, saturated with strong gasoline odor.

(Continued on Page 2)

COMPLETION DATA



(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MONITOR WELL CONSTRUCTION

JONES & NEUSE
GULF COAST REGION OF RMT

WELL NO. MW-154A
SHEET 2 OF 2

CLIENT: FINA OIL AND CHEMICAL COMPANY
JOB NO: 019505.02
SITE: BIG SPRING, TEXAS
DATE: START: 1239 June 21, 1994 FINISH: 1410 June 21, 1994
GEOLOGIST: James D. Shotwell
DRILLER: Dusty Choate
DRILLING RIG TYPE: Failing 1500
DRILLING METHODS: Air Rotary
TOTAL DEPTH: 120 feet
HOLE DIAMETER: 6.75 inches
SITE COORDINATES: 240341.22' N + 787129.83' E
ELEVATIONS: GROUND: 2448.61 PAD: 2449.11 TOC: 2451.58 PROT. CSG: 2452.21
WATER LEVEL: DEPTH: DATUM: DATE: TIME:

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION
100				GP		SANDY GRAVEL as above.
				CH		CLAY highly plastic, hard, orange-red, damp.
110				CH		CLAY as above.
120				CH		CLAY as above.
						Boring terminated @ 120 feet below grade.

COMPLETION DATA

MATERIAL SETTINGS	BELOW GRADE MATERIAL COMPLETIONS CONTINUED FROM PREVIOUS PAGE
100	
110	8\16 Filter Pack Sand
120	Sand Point set @ 102'

(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MW-PG2.WK3

MONITOR WELL CONSTRUCTION

JONES & NEUSE
GULF COAST REGION OF RMT

WELL NO. MW-155

CLIENT: Fina Oil and Chemical JOB NO: 50-00195.05.002 SHEET 1 OF 1

SITE: Big Spring Refinery DATE: START: 10/20/94 FINISH: 10/20/94

GEOLOGIST: Brad Stokes DRILLER: Choate Well Service DRILLING RIG TYPE: Failing 1000

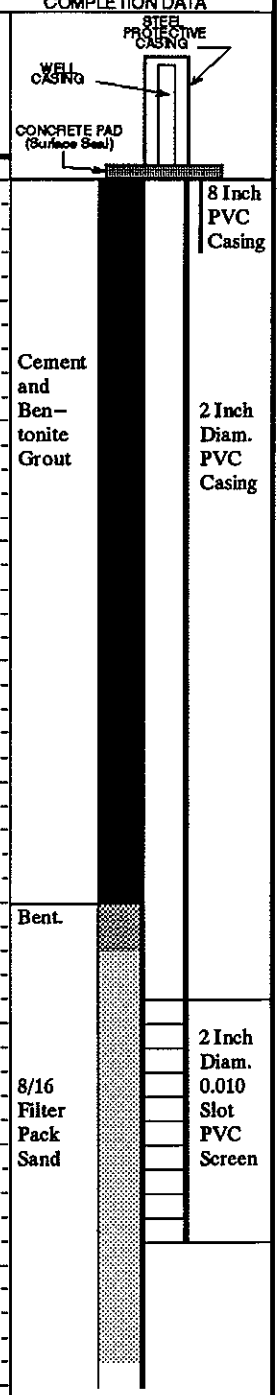
DRILLING METHODS: Air / Wet Rotary TOTAL DEPTH: 97 Feet HOLE DIAMETER: 6.75 Inches

SITE COORDINATES: N 240881.98 / E 795473.86 ELEVATIONS: GROUND: 2452.7 PAD: 2452.99 TOC: 2455.65 PROT. CSG: 2456.01

WATER LEVEL: DEPTH: DATUM: DATE: TIME:

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION
0				SM		SILTY SAND –fine to very fine grained rounded quartz, with 20 to 30% silt, compact, dry, reddish tan color
						–caliche sand below 4 feet, lightly cemented to uncemented, light reddish tan color
10						
						–sandstone seam from 16 to 16.5 feet, with occassional caliche nodules scattered throughout
20						
30						
						–sandstone seam from 32 to 44 feet, lightly cemented, very soft
40						
50						
60						
70						–saturated below 69 feet
80						
90						–sandstone seam from 89 to 90 feet
						–"false Red Bed" at 96 feet, clayey sand, brick red color
100						BORING TERMINATED AT 97.0 FEET BELOW GRADE

COMPLETION DATA



(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MW-ST-SC.WK3

MONITOR WELL CONSTRUCTION

JONES & NEUSE
GULF COAST REGION OF RMT

WELL NO. MW-155A

CLIENT: Fina Oil and Chemical JOB NO: 50-00195.05.002 SHEET 1 OF 2

SITE: Big Spring Refinery DATE: START: 10/17/94 FINISH: 10/18/94

GEOLOGIST: Brad Stokes DRILLER: Choate Well Service DRILLING RIG TYPE: Failing 1000

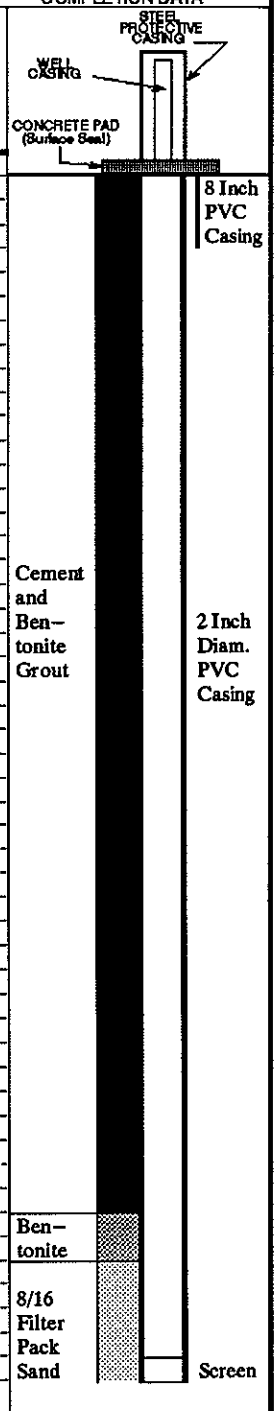
DRILLING METHODS: Air / Wet Rotary TOTAL DEPTH: 120 Feet HOLE DIAMETER: 6.75 Inches

SITE COORDINATES: N 240881.11 / E 795473.86 ELEVATIONS: GROUND: 2452.2 PAD: 2452.45 TOC: 2455.11 PROT. CSG: 2455.50

WATER LEVEL: DEPTH: DATUM: DATE: TIME:

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION
0				SM		SILTY SAND –fine to very fine grained, rounded quartz, with 20 to 30% silt in matrix, compact, dry, reddish tan color
						–some caliche sand, uncemented, light reddish tan color
10						
20						
						–sandstone seam from 25 to 25.5 feet, moderately cemented
30						–sandstone seam from 28 to 29 feet, moderately cemented
40						–sandstone seam from 38 to 40 feet, moderately cemented
50						
60						
70						–saturated below 69 feet, slight odor
80						–sandstone seam from 82 to 85 feet, moderately cemented
90						–sandstone seam from 89 to 90 feet, moderately cemented
100				GW		SANDY GRAVEL well rounded quartz chert and limestone gravel, pebble sized, with medium to fine quartz sand, well graded

COMPLETION DATA



(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MW-ST-SC.WK3

MONITOR WELL CONSTRUCTION

JONES & NEUSE
GULF COAST REGION OF RMT

WELL NO. MW-155A

CLIENT: Fina Oil and Chemical JOB NO: 50-00195.05.002 SHEET 2 OF 2

SITE: Big Spring Refinery DATE: START: 10/17/94 FINISH: 10/18/94

GEOLOGIST: Brad Stokes DRILLER: Choate Well Service DRILLING RIG TYPE: Failing 1000

DRILLING METHODS: Air / Wet Rotary TOTAL DEPTH: 120 Feet HOLE DIAMETER: 6.75 Inches

SITE COORDINATES: N 240881.11 / E 795473.86 ELEVATIONS: GROUND: 2452.2 PAD: 2452.45 TOC: 2455.11 PROT. CSG: 2455.50

WATER LEVEL: DEPTH: DATUM: DATE: TIME:

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION	MATERIAL SETTINGS	COMPLETION DATA
100						SANDY GRAVEL		BELOW GRADE MATERIAL COMPLETIONS CONTINUED FROM PREVIOUS PAGE
110				CH		SILTY CLAY –moderate plasticity, with 20 to 25% silt and fine sand in matrix, stiff, damp, brick red color, DOCKUM FM.	107	
120				Ss		SANDSTONE –very fine to fine grained, moderately cemented to well cemented, hard, dark red	120	
						BORING TERMINATED AT 120.0 FEET BELOW GRADE		

(1) UNIFIED SOIL CLASSIFICATION SYSTEM

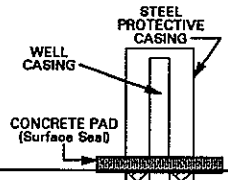
MW-P2-SC.WK3

WELL CONSTRUCTION LOG

WELL NO. MW-214

Client: FINA OIL AND CHEMICAL COMPANY		Start Date: 1-29-97 / End Date: 1-29-97	Page 1 of 3
Site: EAST BOUNDARY INVESTIGATION - BIG SPRING, TEXAS		Drilling Method: Air/ Wet Rotary	Project Number: 50-01858.15
Geologist: Tracy Payne	Driller: Choate Well Service	Drill Rig Type: Failing 1000	Borehole Diameter: 6.75 Inches
Site Coordinates, UTM in ft.: N: 243573.4000 E: 793754.6600	Total Depth (ft-bgl): 120.00	Surface Elevation(ft): 2474.45 / TOC Elevation(ft): 2477.46	PAD Elevation(ft): 2474.70
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft): / Date:	Time:

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				1–9		Windblown Silty Sand Sediment - Dry, Loose, Black
				1–10		Clayey Sand (SC) - Very fine to fine grained, quartz, 40% clay, compact, damp, reddish orange brown
				10–20		Silty Sand (SM) - Very fine to fine grained, 20% silt, quartz, loose, dry, pinkish tan
				20–30		Silty Sand (SM) - Similar to above, 20-30% silt
				30–40		Silty Sand (SM) - Similar to above
				40–49		Silty Sand (SM) - Similar to above



WELL 01858 1/13/98

F-204A Austin (8-95)

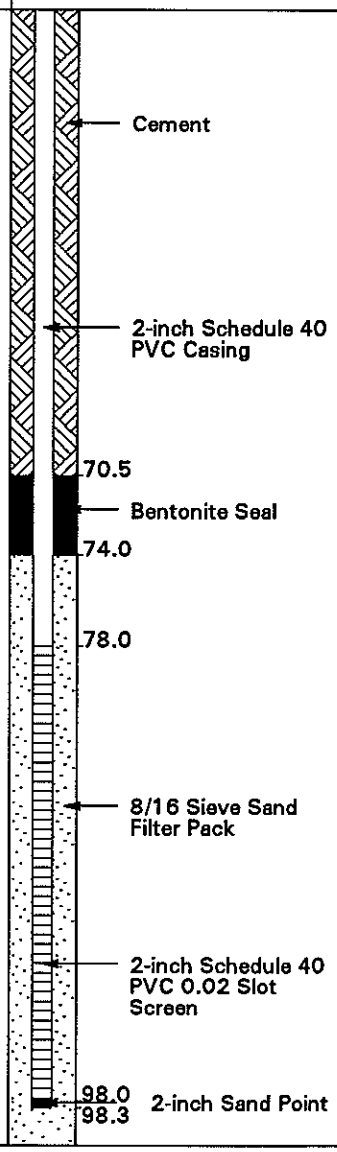
Continued Next Page

WELL CONSTRUCTION LOG

WELL NO. MW-214

Client:		Start Date:	End Date:	Page of
FINA OIL AND CHEMICAL COMPANY		1-29-97	1-29-97	2 3
Site:		**Drilling Method:**		**Project Number:**
EAST BOUNDARY INVESTIGATION - BIG SPRING, TEXAS		Air/ Wet Rotary		50-01858.15
Geologist:	**Driller:**	**Drill Rig Type:**		**Borehole Diameter:**
Tracy Payne	Choate Well Service	Failing 1000		6.75 Inches
Site Coordinates, UTM in ft.:	**Total Depth (ft-bgl):**	**Surface Elevation(ft)**	**TOC Elevation(ft)**	**PAD Elevation(ft)**
N: 243573.4000 E: 793754.6600	120.00	2474.45	2477.46	2474.70
Datum Description Source:	**Datum Elev. (ft):**	**Water Level Depth Below Grade(ft):**	**Date:**	**Time:**

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				51–99		Silty Sand (SM) - Very fine to fine grained, 30% silt, quartz, loose, dry, pinkish tan Silty Sand (SM) - Similar to above Silty Sand (SM) - Similar to above Damp at 75 feet Saturation at 79 feet Silty Sand (SM) - Similar to above, saturated, odor, occasional sandstone nodules Silty Sand (SM) - Similar to above, odor becomes stronger with depth, sheen noted on produced water



WELL 01858 1/13/98

F-204A Austin (8-95)

Continued Next Page

WELL CONSTRUCTION LOG

WELL NO. MW-214

Client:		Start Date:	End Date:	Page of
FINA OIL AND CHEMICAL COMPANY		1-29-97	1-29-97	3 3
Site:		**Drilling Method:**		**Project Number:**
EAST BOUNDARY INVESTIGATION - BIG SPRING, TEXAS		Air/ Wet Rotary		50-01858.15
Geologist:	**Driller:**	**Drill Rig Type:**		**Borehole Diameter:**
Tracy Payne	Choate Well Service	Failing 1000		6.75 Inches
Site Coordinates, UTM in ft.:	**Total Depth (ft-bgl):**	**Surface Elevation(ft)**	**TOC Elevation(ft)**	**PAD Elevation(ft)**
N: 243573.4000 E: 793754.6600	120.00	2474.45	2477.46	2474.70
Datum Description Source:	**Datum Elev. (ft):**	**Water Level Depth Below Grade(ft):**	**Date:**	**Time:**

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				101–113		Silty Sand (SM) - Very fine to fine grained, 30% silt, quartz, loose, saturated, pinkish tan, odor increasing
				113–114		Silty Sand (SM) - Similar to above, saturated, odor
				114–115		Sandy Clay (CL) - Low plasticity, 50% sand, very soft, reddish brown, saturated, odor
				115–120		Sandy Gravel (GW) - Well graded, granule to large(1-1.5") pebbles, sub-angular to subrounded, quartz, chert, sandstone, sandstone conglomerates, shell fragments, limestone, saturated, reddish brown, fine to medium grained sand, quartz, 20% sand increasing to 40-50% with depth, strong odor
				120–149		BORING TERMINATED AT 120 FEET BELOW GRADE

8/16 Sieve Sand Filter Pack

104.0

Collapsed Borehole

120.0

WELL 01858 1/13/98

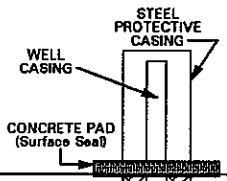
F-204A Austin (8-95)

WELL CONSTRUCTION LOG

WELL NO. MW-214A

Client:		Start Date:	End Date:	Page of
FINA OIL AND CHEMICAL COMPANY		2-3-97	2-3-97	1 3
Site:		**Drilling Method:**		**Project Number:**
EAST BOUNDARY INVESTIGATION - BIG SPRING, TEXAS		Air/ Wet Rotary		50-01858.15
Geologist:	**Driller:**	**Drill Rig Type:**		**Borehole Diameter:**
Tracy Payne	Choate Well Service	Failing 1000		6.75 Inches
Site Coordinates, UTM in ft.:	**Total Depth (ft-bgl):**	**Surface Elevation(ft)**	**TOC Elevation(ft)**	**PAD Elevation(ft)**
N: 243560.9400 E: 793756.8200	130.00	2474.58	2477.59	2474.83
Datum Description Source:	**Datum Elev. (ft):**	**Water Level Depth Below Grade(ft):**	**Date:**	**Time:**

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				1–9		Windblown Silty Sand Sediment - Dry, Loose, Black
				1–10		Clayey Sand (SC) - Very fine to fine grained, quartz, 40% clay, compact, damp, reddish orange brown
				10–30		Silty Sand (SM) - Very fine to fine grained, 20% silt, quartz, loose, dry, pinkish tan
				20–30		Silty Sand (SM) - Similar to above, 20-30% silt
				30–40		Silty Sand (SM) - Similar to above
				40–49		Silty Sand (SM) - Similar to above



WELL 01858 1/13/98

F-204A Austin (8-95)

Continued Next Page

WELL CONSTRUCTION LOG

WELL NO. MW-214A

Client:		Start Date:	End Date:	Page of
FINA OIL AND CHEMICAL COMPANY		2-3-97	2-3-97	2 3
Site:		**Drilling Method:**		**Project Number:**
EAST BOUNDARY INVESTIGATION - BIG SPRING, TEXAS		Air/ Wet Rotary		50-01858.15
Geologist:	**Driller:**	**Drill Rig Type:**		**Borehole Diameter:**
Tracy Payne	Choate Well Service	Failing 1000		6.75 Inches
Site Coordinates, UTM in ft.:	**Total Depth (ft-bgl):**	**Surface Elevation(ft)**	**TOC Elevation(ft)**	**PAD Elevation(ft)**
N: 243560.9400 E: 793756.8200	130.00	2474.58	2477.59	2474.83
Datum Description Source:	**Datum Elev. (ft):**	**Water Level Depth Below Grade(ft):**	**Date:**	**Time:**

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				51–99		Silty Sand (SM) - Very fine to fine grained, 30% silt, quartz, loose, dry, pinkish tan, occasional sandstone nodules
						Silty Sand (SM) - Similar to above
						Silty Sand (SM) - Similar to above
						Damp at 75 feet
		▽				Saturation at 79 feet
						Silty Sand (SM) - Similar to above, saturated, odor, occasional sandstone nodules, sheen noted on produced water
						Silty Sand (SM) - Similar to above, odor becomes stronger with depth

Cement

2-inch Schedule 40 PVC Casing

WELL 01858 1/13/98

F-204A Austin (8-95)

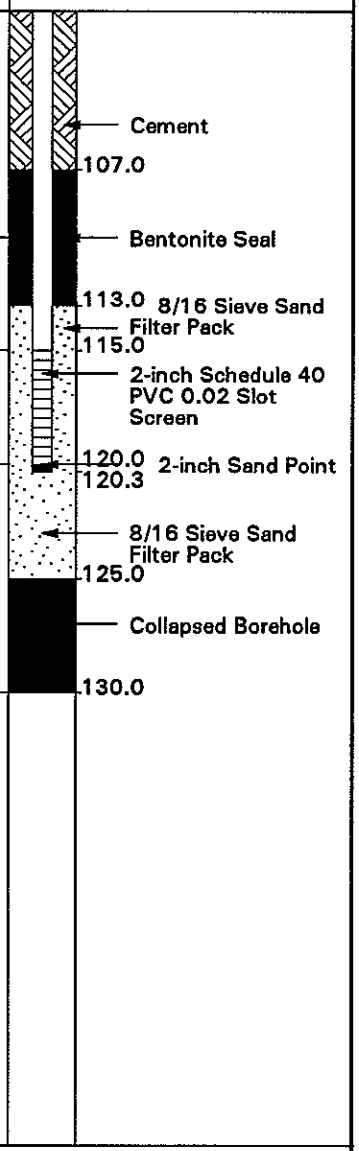
Continued Next Page

WELL CONSTRUCTION LOG

WELL NO. MW-214A

Client:		Start Date:	End Date:	Page of
FINA OIL AND CHEMICAL COMPANY		2-3-97	2-3-97	3 3
Site:		**Drilling Method:**		**Project Number:**
EAST BOUNDARY INVESTIGATION - BIG SPRING, TEXAS		Air/ Wet Rotary		50-01858.15
Geologist:	**Driller:**	**Drill Rig Type:**		**Borehole Diameter:**
Tracy Payne	Choate Well Service	Failing 1000		6.75 Inches
Site Coordinates, UTM in ft.:	**Total Depth (ft-bgl):**	**Surface Elevation(ft)**	**TOC Elevation(ft)**	**PAD Elevation(ft)**
N: 243560.9400 E: 793756.8200	130.00	2474.58	2477.59	2474.83
Datum Description Source:	**Datum Elev. (ft):**	**Water Level Depth Below Grade(ft):**	**Date:**	**Time:**

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				101–109		Silty Sand (SM) - Very fine to fine grained, 30% silt, quartz, loose, odor, saturated, pinkish tan
				110–114		Sandy Clay (CL) - Low plasticity, 50% sand, very soft, reddish brown, saturated, odor
				115–119		Sandy Gravel (GW) - Well graded, large granule gravel, (platy), sub-angular, saturated, fine to medium grained sand, quartz, 30-40% sand, odor
				120–129		Clay (CH) - Moderate plasticity, firm, dry, reddish brown, Dockum Formation
				130		BORING TERMINATED AT 130 FEET BELOW GRADE
				131–149		



WELL 01858 1/13/98

F-204A Austin (8-95)

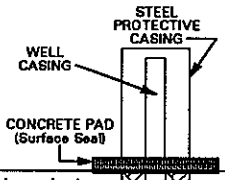
WELL CONSTRUCTION LOG

WELL NO. MW-218

Client:		Start Date:	End Date:	Page of
FINA OIL AND CHEMICAL COMPANY		2-5-97	2-5-97	1 3
Site:		**Drilling Method:**		**Project Number:**
EAST BOUNDARY INVESTIGATION - BIG SPRING, TEXAS		Air/ Wet Rotary		50-01858.15
Geologist:	**Driller:**	**Drill Rig Type:**		**Borehole Diameter:**
Tracy Payne	Choate Well Service	Failing 1000		6.75 Inches
Site Coordinates, UTM in ft.:	**Total Depth (ft-bgl):**	**Surface Elevation(ft)**	**TOC Elevation(ft)**	**PAD Elevation(ft)**
N: 241950.8700 E: 794588.7100	105.00	2464.84	2468.14	2465.09
Datum Description Source:	**Datum Elev. (ft):**	**Water Level Depth Below Grade(ft):**	**Date:**	**Time:**

Sample Type | Recovery (%) | Saturation | PID (ppm) | Depth (feet) | Stratigraphy

LITHOLOGIC DESCRIPTION



Silty Clay (CL) - Moderate plasticity, 20% silt, firm, dry, dark brown

Silty Clay (CL) - Similar to above, except damp and reddish brown, 30% silt

Silty Sand (SM) - Fine to very fine grained, quartz, 30-40% silt, compact, dry, pinkish tan

Caliche (LS) - Fine grained, grey to whitish pink, dense

Silty Sand (SM) - Fine to very fine grained, quartz, 30-40% silt, compact, dry, pinkish tan

Silty Sand (SM) - Similar to above, 20-30% silt, reddish tan

Silty Sand (SM) - Similar to above

Cement

2-inch Schedule 40 PVC Casing

WELL 01858 1/13/98

F-204A Austin (8-95)

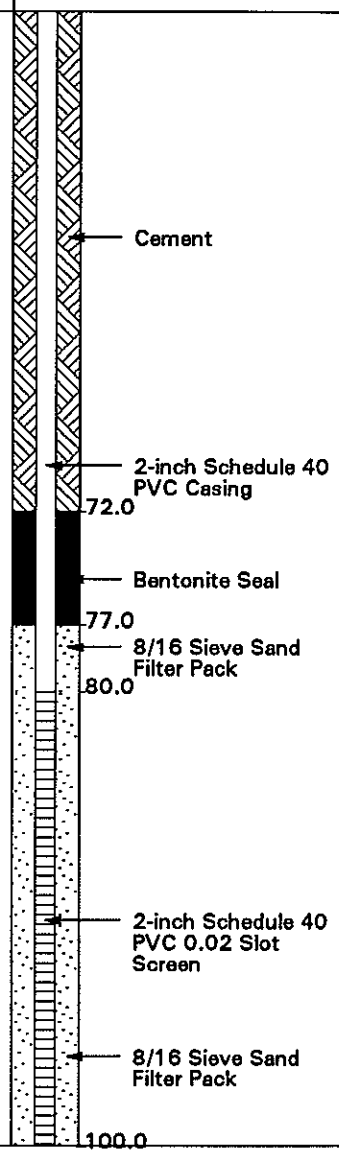
Continued Next Page

WELL CONSTRUCTION LOG

WELL NO. MW-218

Client:		Start Date:	End Date:	Page of
FINA OIL AND CHEMICAL COMPANY		2-5-97	2-5-97	2 3
Site:		**Drilling Method:**		**Project Number:**
EAST BOUNDARY INVESTIGATION - BIG SPRING, TEXAS		Air/ Wet Rotary		50-01858.15
Geologist:	**Driller:**	**Drill Rig Type:**		**Borehole Diameter:**
Tracy Payne	Choate Well Service	Failing 1000		6.75 Inches
Site Coordinates, UTM in ft.:	**Total Depth (ft-bgl):**	**Surface Elevation(ft)**	**TOC Elevation(ft)**	**PAD Elevation(ft)**
N: 241950.8700 E: 794588.7100	105.00	2464.84	2468.14	2465.09
Datum Description Source:	**Datum Elev. (ft):**	**Water Level Depth Below Grade(ft):**	**Date:**	**Time:**

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				51–99		Silty Sand (SM) - Fine to very fine grained, quartz, 20-30% silt, compact, dry, reddish tan.
						Silty Sand (SM) - Similar to above
						Silty Sand (SM) - Similar to above, damp to moist at base
		▽				Silty Sand (SM) - Fine grained, quartz, 20% silt, firm, moist, reddish, tan Saturation at 81 feet
						Silty Sand (SM) - Similar to above, saturated



WELL 01858 1/13/98

F-204A Austin (8-95)

Continued Next Page

WELL CONSTRUCTION LOG

WELL NO. MW-218

Client:		Start Date:	End Date:	Page of
FINA OIL AND CHEMICAL COMPANY		2-5-97	2-5-97	3 3
Site:		**Drilling Method:**		**Project Number:**
EAST BOUNDARY INVESTIGATION - BIG SPRING, TEXAS		Air/ Wet Rotary		50-01858.15
Geologist:	**Driller:**	**Drill Rig Type:**		**Borehole Diameter:**
Tracy Payne	Choate Well Service	Failing 1000		6.75 Inches
Site Coordinates, UTM in ft.:	**Total Depth (ft-bgl):**	**Surface Elevation(ft)**	**TOC Elevation(ft)**	**PAD Elevation(ft)**
N: 241950.8700 E: 794588.7100	105.00	2464.84	2468.14	2465.09
Datum Description Source:	**Datum Elev. (ft):**	**Water Level Depth Below Grade(ft):**	**Date:**	**Time:**

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				101		Silty Sand (SM) - Fine grained, quartz, 20% silt, firm, saturated, reddish tan
				102		
				103		
				104		
				105		
				106		BORING TERMINATED AT 105 FEET BELOW GRADE
				107		
				108		
				109		
				110		
				111		
				112		
				113		
				114		
				115		
				116		
				117		
				118		
				119		
				120		
				121		
				122		
				123		
				124		
				125		
				126		
				127		
				128		
				129		
				130		
				131		
				132		
				133		
				134		
				135		
				136		
				137		
				138		
				139		
				140		
				141		
				142		
				143		
				144		
				145		
				146		
				147		
				148		
				149		

100.3 2-inch Sand Point
101.0
Collapsed Borehole
105.0

WELL 01858 1/13/98

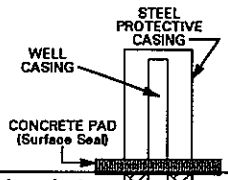
F-204A Austin (8-95)

WELL CONSTRUCTION LOG

WELL NO. MW-218A

Client:		Start Date:	End Date:	Page of
FINA OIL AND CHEMICAL COMPANY		1-17-97	1-17-97	1 3
Site:		**Drilling Method:**		**Project Number:**
EAST BOUNDARY INVESTIGATION - BIG SPRING, TEXAS		Air/ Wet Rotary		50-01858.15
Geologist:	**Driller:**	**Drill Rig Type:**		**Borehole Diameter:**
Tracy Payne	Choate Well Service	Failing 1000		6.75 Inches
Site Coordinates, UTM in ft.:	**Total Depth (ft-bgl):**	**Surface Elevation(ft)**	**TOC Elevation(ft)**	**PAD Elevation(ft)**
N: 241951.5100 E: 794600.3000	130.00	2464.82	2467.84	2465.07
Datum Description Source:	**Datum Elev. (ft):**	**Water Level Depth Below Grade(ft):**	**Date:**	**Time:**

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				1–9		Silty Clay (CL) - Moderate plasticity, 20% silt, firm, dry, dark brown
				1–9		Silty Clay (CL) - Similar to above, except damp and reddish brown, 30% silt
				10–19		Silty Sand (SM) - Fine to very fine grained, quartz, 30-40% silt, compact, dry, pinkish tan
				20		Caliche (LS) - Fine grained, grey to whitish pink
				20–49		Silty Sand (SM) - Fine to very fine grained, quartz, 30-40% silt, compact, dry, pinkish tan
				30–31		Silty Sand (SM) - Similar to above, 20-30% silt, reddish tan
				41		Silty Sand (SM) - Similar to above



WELL 01868 1/13/98

F-204A Austin (8-95)

Continued Next Page

WELL CONSTRUCTION LOG

WELL NO. MW-218A

Client:		Start Date:	End Date:	Page of
FINA OIL AND CHEMICAL COMPANY		1-17-97	1-17-97	2 3
Site:		**Drilling Method:**		**Project Number:**
EAST BOUNDARY INVESTIGATION - BIG SPRING, TEXAS		Air/ Wet Rotary		50-01858.15
Geologist:	**Driller:**	**Drill Rig Type:**		**Borehole Diameter:**
Tracy Payne	Choate Well Service	Failing 1000		6.75 Inches
Site Coordinates, UTM in ft.:	**Total Depth (ft-bgl):**	**Surface Elevation(ft)**	**TOC Elevation(ft)**	**PAD Elevation(ft)**
N: 241951.5100 E: 794600.3000	130.00	2464.82	2467.84	2465.07
Datum Description Source:	**Datum Elev. (ft):**	**Water Level Depth Below Grade(ft):**	**Date:**	**Time:**

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				51–99		Silty Sand (SM) - Fine to very fine grained, quartz, 20-30% silt, compact, dry, reddish tan.
						Silty Sand (SM) - Similar to above
						Silty Sand (SM) - Similar to above, damp to moist at base
		▽				Silty Sand (SM) - Fine grained, quartz, 20% silt, firm, moist, reddish tan Saturation at 81 feet
						Silty Sand (SM) - Similar to above, saturated

Cement

2-inch Schedule 40 PVC Casing

99.0

WELL 01868 1/13/98

F-204A Austin (8-95)

Continued Next Page

WELL CONSTRUCTION LOG

WELL NO. MW-218A

Client:		Start Date:	End Date:	Page of
FINA OIL AND CHEMICAL COMPANY		1-17-97	1-17-97	3 3
Site:		**Drilling Method:**		**Project Number:**
EAST BOUNDARY INVESTIGATION - BIG SPRING, TEXAS		Air/ Wet Rotary		50-01858.15
Geologist:	**Driller:**	**Drill Rig Type:**		**Borehole Diameter:**
Tracy Payne	Choate Well Service	Failing 1000		6.75 Inches
Site Coordinates, UTM in ft.:	**Total Depth (ft-bgl):**	**Surface Elevation(ft)**	**TOC Elevation(ft)**	**PAD Elevation(ft)**
N: 241951.5100 E: 794600.3000	130.00	2464.82	2467.84	2465.07
Datum Description Source:	**Datum Elev. (ft):**	**Water Level Depth Below Grade(ft):**	**Date:**	**Time:**

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				101–109		Silty Sand (SM) - Fine grained, quartz, 20% silt, firm, saturated, reddish tan
				110–112		Silty Clay (CL) - Low plasticity, very soft, saturated, reddish brown
				113–116		Clayey Gravel (GC) - Low plasticity, very soft clay, granule to pebble sized gravel, angular, quartz, chert, limestone, shell fragments, saturated
				117–129		Clay (CH) - Moderate plasticity, soft, dry, dark reddish brown, traces of grey colored clay, Dockum Formation Clay (CH) - Similar to above
				130–149		BORING TERMINATED AT 130 FEET BELOW GRADE NOTE: 2 1/2" blank at top of screen and 4 3/4" blank at bottom of screen

Bentonite Seal
104.0
8/16 Sieve Sand Filter Pack
111.0
2-inch Schedule 40 PVC 0.02 Slot Screen
116.0 2-inch Sand Point
116.3
8/16 Sieve Sand Filter Pack
120.0
Collapsed Borehole
130.0

WELL 01858 1/13/98

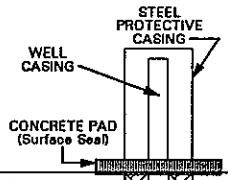
F-204A Austin (8-95)

WELL CONSTRUCTION LOG

WELL NO. MW-220

Client:		Start Date:	End Date:	Page of
Fina Oil and Chemical Co.		11-19-97	11-19-97	1 3
Site:		**Drilling Method:**		**Project Number:**
Northweast Boundary Investigation, Big Spring		Air/Wet Rotary		50-01858.26
Geologist:	**Driller:**	**Drill Rig Type:**		**Borehole Diameter:**
Tracy Payne	Choate Well Service	Failing 1000		6.75 Inches
Site Coordinates, UTM in ft.:	**Total Depth (ft-bgl):**	**Surface Elevation(ft)**	**TOC Elevation(ft)**	**PAD Elevation(ft)**
N: 244721.8000 E: 792847.7700	115.00		2492.53	2489.69
Datum Description Source:	**Datum Elev. (ft):**	**Water Level Depth Below Grade(ft):**	**Date:**	**Time:**

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				1–9		Silty Sand(SM) Fine grained, poorly graded, subangular, compact, dry, dark brown 0-1, grades to a reddish brown.
				10–19		Clayey Sand(SC) 10% clay, soft, damp, fine grained, poorly graded, compact, orangish red.
				20–29		Silty Sand(SM) 10-20% silt, very fine to fine grained, poorly graded, subrounded, compact, dry, light orangish tan.
				30–39		Silty Sand(SM) Similar to above.
				40–49		Silty Sand(SM) Similar to above.



Cement/Bentonite Grout

2-inch PVC Casing

WELL 18586 1/13/98

F-204A Austin (8-95)

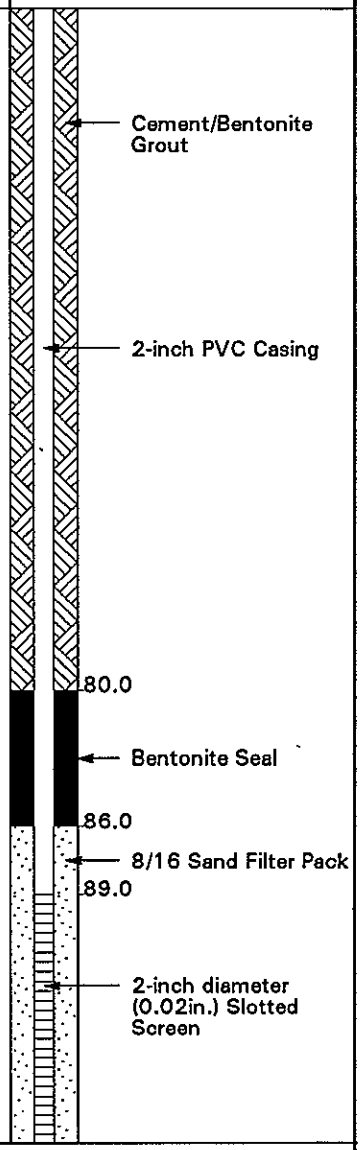
Continued Next Page

WELL CONSTRUCTION LOG

WELL NO. MW-220

Client:		Start Date:	End Date:	Page of
Fina Oil and Chemical Co.		11-19-97	11-19-97	2 3
Site:		Drilling Method:		Project Number:
Northweast Boundary Investigation, Big Spring		Air/Wet Rotary		50-01858.26
Geologist:	Driller:	Drill Rig Type:		Borehole Diameter:
Tracy Payne	Choate Well Service	Failing 1000		6.75 Inches
Site Coordinates, UTM in ft.:	Total Depth (ft-bgl):	Surface Elevation(ft)	TOC Elevation(ft)	PAD Elevation(ft)
N: 244721.8000 E: 792847.7700	115.00		2492.53	2489.69
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				51–99		Silty Sand(SM) 20-30% silt, very fine to fine grained, poorly graded, subrounded, compact, dry, light pinkish tan.
						Silty Sand(SM) Similar to above, tan.
						Silty Sand(SM) Similar to above.
						Silty Sand(SM) Similar to above, damp at base.
						Silty Sand(SM) Similar to above, damp to moist.
		▽				Silty Sand(SM) Similar to above, saturated at 90 feet.



WELL 18586 1/13/98

F-204A Austin (8-95)

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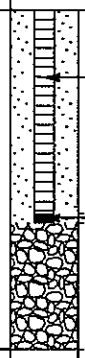
WELL CONSTRUCTION LOG

WELL NO. MW-220

Client:		Start Date:	End Date:	Page of
Fina Oil and Chemical Co.		11-19-97	11-19-97	3 3
Site:		**Drilling Method:**		**Project Number:**
Northweast Boundary Investigation, Big Spring		Air/Wet Rotary		50-01858.26
Geologist:	**Driller:**	**Drill Rig Type:**		**Borehole Diameter:**
Tracy Payne	Choate Well Service	Failing 1000		6.75 Inches
Site Coordinates, UTM in ft.:	**Total Depth (ft-bgl):**	**Surface Elevation(ft)**	**TOC Elevation(ft)**	**PAD Elevation(ft)**
N: 244721.8000 E: 792847.7700	115.00		2492.53	2489.69
Datum Description Source:	**Datum Elev. (ft):**	**Water Level Depth Below Grade(ft):**	**Date:**	**Time:**

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				101–115		Silty Sand(SM) 20-30% silt, very fine to fine grained, poorly graded, subrounded, compact, saturated, tan.
				101–115		Silty Sand(SM) Similar to above.
				115		BORING TERMINATED AT 115 FEET BELOW GRADE



WELL 18586 1/13/98

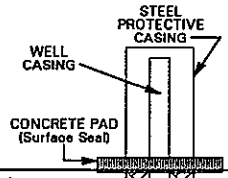
F-204A Austin (8-95)

WELL CONSTRUCTION LOG

WELL NO. MW-220A

Client:		Start Date:	End Date:	Page of
Fina Oil and Chemical Co.		10-31-97	10-31-97	1 3
Site:		**Drilling Method:**		**Project Number:**
Northweast Boundary Investigation, Big Spring		Air/Wet Rotary		50-01858.26
Geologist:	**Driller:**	**Drill Rig Type:**		**Borehole Diameter:**
Tracy Payne	Choate Well Service	Failing 1000		6.75 Inches
Site Coordinates, UTM in ft.:	**Total Depth (ft-bgl):**	**Surface Elevation(ft)**	**TOC Elevation(ft)**	**PAD Elevation(ft)**
N: 244737.0400 E: 792839.0000	140.00		2492.95	2490.28
Datum Description Source:	**Datum Elev. (ft):**	**Water Level Depth Below Grade(ft):**	**Date:**	**Time:**

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				1–9		Silty Sand(SM) Fine grained, poorly graded, subangular, compact, dry, dark brown 0-1 foot, grades to a reddish brown.
				10–20		Clayey Sand(SC) 10% clay, soft, damp, fine grained, poorly grade, compact, orangish red.
				20–30		Silty Sand(SM) 10-20% silt, very fine to fine grained, poorly graded, subrounded, compact, dry, light orangish tan.
				30–40		Silty Sand(SM) Similar to above.
				40–49		Silty Sand(SM) Similar to above.



Cement/Bentonite Grout

2-inch PVC Casing

WELL 18586 1/13/98

F-204A Austin (8-95)

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WELL CONSTRUCTION LOG

WELL NO. MW-220A

Client:		Start Date:	End Date:	Page of
Fina Oil and Chemical Co.		10-31-97	10-31-97	2 3
Site:		Drilling Method:		Project Number:
Northweast Boundary Investigation, Big Spring		Air/Wet Rotary		50-01858.26
Geologist:	Driller:	Drill Rig Type:		Borehole Diameter:
Tracy Payne	Choate Well Service	Failing 1000		6.75 Inches
Site Coordinates, UTM in ft.:	Total Depth (ft-bgl):	Surface Elevation(ft)	TOC Elevation(ft)	PAD Elevation(ft)
N: 244737.0400 E: 792839.0000	140.00		2492.95	2490.28
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				51–99		Silty Sand(SM) 20-30% silt, very fine to fine grained, poorly graded, subrounded, compact, dry, light pinkish tan.
						Silty Sand(SM) Similar to above, tan.
						Silty Sand(SM) Similar to above.
						Silty Sand(SM) Similar to above, damp at base.
						Silty Sand(SM) Similar to above, damp to moist.
						Silty Sand(SM) Similar to above, moist, saturated at 95 feet.

Cement/Bentonite Grout

2-inch PVC Casing

WELL 18586 1/13/98

F-204A Austin (8-95)

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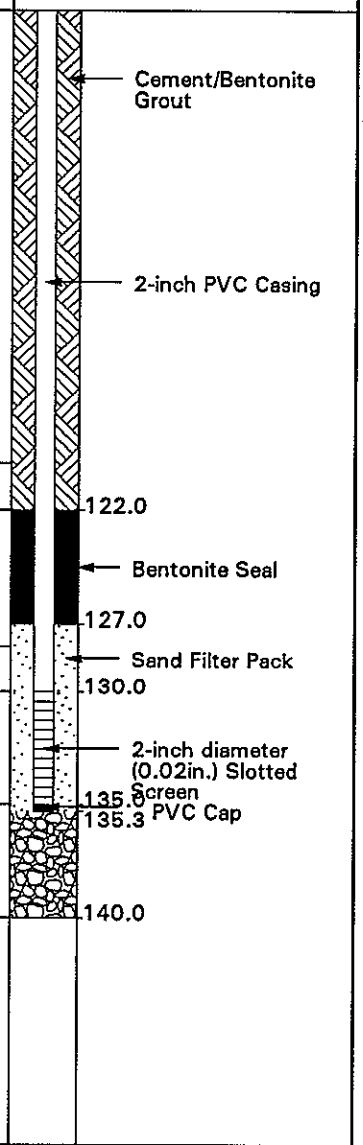
WELL CONSTRUCTION LOG

WELL NO. MW-220A

Client: Fina Oil and Chemical Co.		Start Date: 10-31-97	End Date: 10-31-97	Page 3 of 3
Site: Northweast Boundary Investigation, Big Spring		Drilling Method: Air/Wet Rotary		Project Number: 50-01858.26
Geologist: Tracy Payne	Driller: Choate Well Service	Drill Rig Type: Failing 1000		Borehole Diameter: 6.75 Inches
Site Coordinates, UTM in ft.: N: 244737.0400 E: 792839.0000	Total Depth (ft-bgl): 140.00	Surface Elevation(ft)	TOC Elevation(ft) 2492.95	PAD Elevation(ft) 2490.28
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				101–120		Silty Sand(SM) 20-30% silt, very fine to fine grained, poorly graded, subrounded, compact, dry, tan, saturated.
				111–119		Silty Sand(SM) Similar to above, sandstone seam at 118-119 feet
				120–121		Sandstone Seam(SS) Seam, well cemented, dense.
				122–128		Silty Sand(SM) Similar to above, saturated.
				125–127		Silty Sand(SM) Similar to above, saturated.
				128–130		Clay(CL) Low plasticity, soft, slightly sandy, light reddish brown, saturated.
				130–135		Gravel(GP) Large granule to small pebbles, subrounded, compact, chert, quartz, saturated.
				135–140		Clay(CH) High plasticity, firm to soft, dry, dark reddish brown/gray, Dockum Formation.
				140		BORING TERMINATED AT 140 FEET BELOW GRADE



WELL 18686 1/13/98

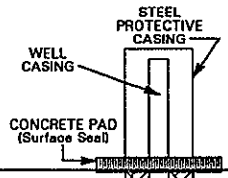
F-204A Austin (8-95)

WELL CONSTRUCTION LOG

WELL NO. MW-221

Client:		Start Date:	End Date:	Page of
Fina Oil and Chemical Co.		11-17-97	11-17-97	1 3
Site:		Drilling Method:		Project Number:
Northweast Boundary Investigation, Big Spring		Air/Wet Rotary		50-01858.26
Geologist:	Driller:	Drill Rig Type:		Borehole Diameter:
Tracy Payne	Choate Well Service	Failing 1000		6.75 Inches
Site Coordinates, UTM in ft.:	Total Depth (ft-bgl):	Surface Elevation(ft)	TOC Elevation(ft)	PAD Elevation(ft)
N: 245810.8600 E: 791199.3800	130.00		2512.68	2509.72
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				1–49		Sand(SP) Fine grained, subrounded, poorly graded, compact, dry, brown.
						Sand(SP) Similar to above, damp, light brown.
						Sand(SP) Similar to above, damp.
						Sand(SM) Similar to above, damp.
						Silty Sand(SM) 20% silt, very fine grained, subrounded, compact, dry to damp, light brown.



Cement/Bentonite Grout

2-inch PVC Casing

WELL 18586 1/13/98

F-204A Austin (8-95)

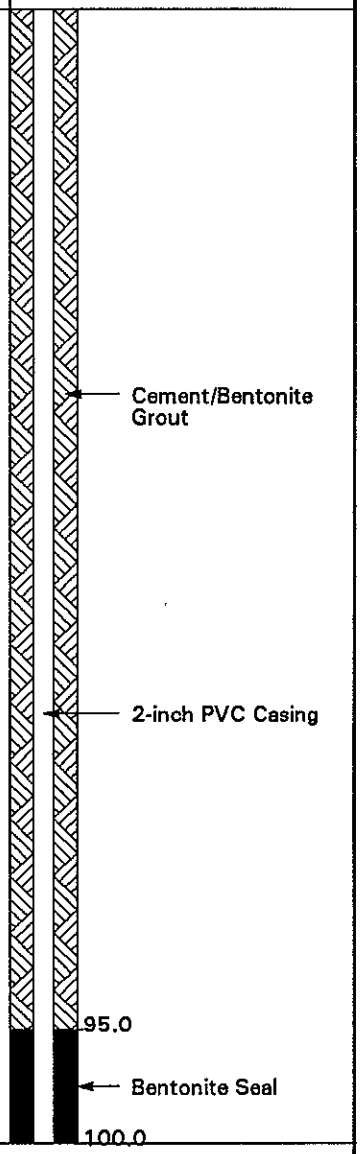
Continued Next Page

WELL CONSTRUCTION LOG

WELL NO. MW-221

Client:		Start Date:	End Date:	Page of
Fina Oil and Chemical Co.		11-17-97	11-17-97	2 3
Site:		Drilling Method:		Project Number:
Northweast Boundery Investigation, Big Spring		Air/Wet Rotary		50-01858.26
Geologist:	Driller:	Drill Rig Type:		Borehole Diameter:
Tracy Payne	Choate Well Service	Failing 1000		6.75 Inches
Site Coordinates, UTM in ft.:	Total Depth (ft-bgl):	Surface Elevation(ft)	TOC Elevation(ft)	PAD Elevation(ft)
N: 245810.8600 E: 791199.3800	130.00		2512.68	2509.72
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				51–99		Silty Sand(SM) 20% silt, very fine grained, subrounded, poorly graded, compact, dry to damp, light brown becoming tan about 58 feet.
						Silty Sand(SM) Similar to above, dry, 20-30% silt.
						Silty Sand(SM) Similar to above, dry.
						Silty Sand(SM) Similar to above.
						Silty Sand(SM) Similar to above, damp at 100 feet.



WELL 18586 1/13/98

F-204A Austin (8-95)

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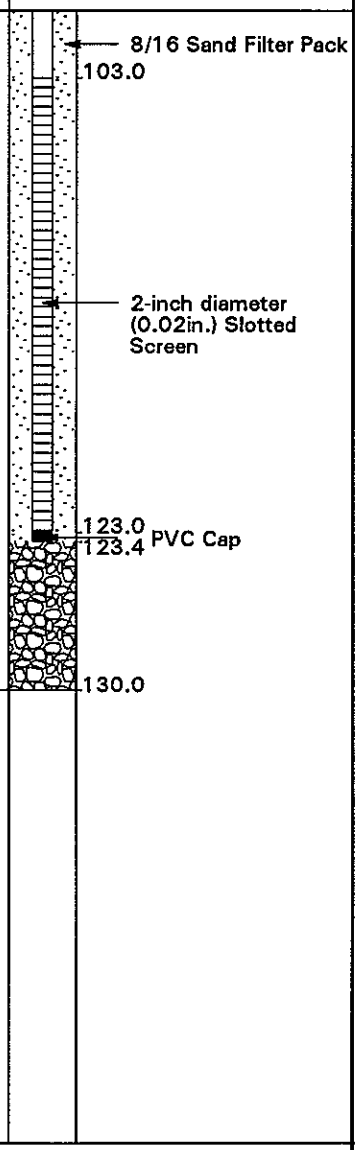
WELL CONSTRUCTION LOG

WELL NO. MW-221

Client:		Start Date:	End Date:	Page of
Fina Oil and Chemical Co.		11-17-97	11-17-97	3 3
Site:		Drilling Method:		Project Number:
Northweast Boundary Investigation, Big Spring		Air/Wet Rotary		50-01858.26
Geologist:	Driller:	Drill Rig Type:		Borehole Diameter:
Tracy Payne	Choate Well Service	Failing 1000		6.75 Inches
Site Coordinates, UTM in ft.:	Total Depth (ft-bgl):	Surface Elevation(ft)	TOC Elevation(ft)	PAD Elevation(ft)
N: 245810.8600 E: 791199.3800	130.00		2512.68	2509.72
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
		▽		101–130		Silty Sand(SM) 20%-30% silt, very fine grained, subrounded, poorly graded, compact, saturated at 104 feet, tan.
						Silty Sand(SM) Similar to above, occasional sandstone seam, saturated.
						Silty Sand(SM) Similar to above.
				130–149		BORING TERMINATED AT 130 FEET BELOW GRADE



WELL 18586 1/13/98

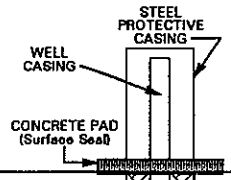
F-204A Austin (8-95)

WELL CONSTRUCTION LOG

WELL NO. MW-221A

Client:		Start Date:	End Date:	Page of
Fina Oil and Chemical Co.		10-28-97	10-28-97	1 4
Site:		Drilling Method:		Project Number:
Northweast Boundary Investigation, Big Spring		Air/Wet Rotary		50-01858.26
Geologist:	Driller:	Drill Rig Type:		Borehole Diameter:
Tracy Payne	Choate Well Service	Failing 1000		6.75 Inches
Site Coordinates, UTM in ft.:	Total Depth (ft-bgl):	Surface Elevation(ft)	TOC Elevation(ft)	PAD Elevation(ft)
N: 245814.6500 E: 791214.7900	160.00		2512.56	2509.66
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				1–9		Sand(SP) Fine grained, subrounded, poorly graded, compact, dry, brown.
				10–19		Sand(SP) Similar to above, damp, light brown.
				20–30		Sand(SP) Similar to above, damp.
				31–39		Sand(SP) Similar to above, damp.
				40–49		Silty Sand(SM) 20% silt, very fine grained, subrounded, poorly graded, compact, dry to damp, light brown.



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F-204A Austin (8-95)

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WELL CONSTRUCTION LOG

WELL NO. MW-221A

Client:		Start Date:	End Date:	Page of
Fina Oil and Chemical Co.		10-28-97	10-28-97	2 4
Site:		**Drilling Method:**		**Project Number:**
Northweast Boundary Investigation, Big Spring		Air/Wet Rotary		50-01858.26
Geologist:	**Driller:**	**Drill Rig Type:**		**Borehole Diameter:**
Tracy Payne	Choate Well Service	Failing 1000		6.75 Inches
Site Coordinates, UTM in ft.:	**Total Depth (ft-bgl):**	**Surface Elevation(ft)**	**TOC Elevation(ft)**	**PAD Elevation(ft)**
N: 245814.6500 E: 791214.7900	160.00		2512.56	2509.66
Datum Description Source:	**Datum Elev. (ft):**	**Water Level Depth Below Grade(ft):**	**Date:**	**Time:**

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				51–99		Silty Sand(SM) 20% silt, very fine grained, subrounded, poorly graded, compact, dry to damp, light brown becoming tan at 58 feet.
						Silty Sand(SM) Similar to above, dry, 20-30% silt.
						Silty Sand(SM) Similar to above.
						Silty Sand(SM) Similar to above.
						Silty Sand(SM) Similar to above, damp at 100 feet.

Cement/Bentonite Grout

2-inch PVC Casing

WELL 19586 1/13/98

F-204A Austin (8-95)

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WELL CONSTRUCTION LOG

WELL NO. MW-221A

Client:		Start Date:	End Date:	Page of
Fina Oil and Chemical Co.		10-28-97	10-28-97	3 4
Site:		**Drilling Method:**		**Project Number:**
Northweast Boundary Investigation, Big Spring		Air/Wet Rotary		50-01858.26
Geologist:	**Driller:**	**Drill Rig Type:**		**Borehole Diameter:**
Tracy Payne	Choate Well Service	Failing 1000		6.75 Inches
Site Coordinates, UTM in ft.:	**Total Depth (ft-bgl):**	**Surface Elevation(ft)**	**TOC Elevation(ft)**	**PAD Elevation(ft)**
N: 245814.6500 E: 791214.7900	160.00		2512.56	2509.66
Datum Description Source:	**Datum Elev. (ft):**	**Water Level Depth Below Grade(ft):**	**Date:**	**Time:**

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				101–149		Silty Sand(SM) 20-30% silt, very fine grained, subrounded, poorly graded, compact, damp, tan.
						Silty Sand(SM) Similar to above, saturated at 115 feet, occasional sandstone seam.
						Silty Sand(SM) Similar to above.
						Silty Sand(SM) Similar to above.
						Silty Sand(SM) Similar to above.
						Clayey Gravel(GC) 20-30% low plasticity, soft clay, reddish brown - gravel - poorly graded, subrounded to subangular, compact,

Cement/Bentonite Grout

2-inch PVC Casing

136.0

Bentonite Seal

146.0

Sand Filter Pack

150.0

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WELL CONSTRUCTION LOG

WELL NO. MW-221A

Client:		Start Date:	End Date:	Page of
Fina Oil and Chemical Co.		10-28-97	10-28-97	4 4
Site:		Drilling Method:		Project Number:
Northweast Boundary Investigation, Big Spring		Air/Wet Rotary		50-01858.26
Geologist:	Driller:	Drill Rig Type:		Borehole Diameter:
Tracy Payne	Choate Well Service	Failing 1000		6.75 Inches
Site Coordinates, UTM in ft.:	Total Depth (ft-bgl):	Surface Elevation(ft)	TOC Elevation(ft)	PAD Elevation(ft)
N: 245814.6500 E: 791214.7900	160.00		2512.56	2509.66
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				151		granule, minor amount (<5%) sand, coarse, chert, quartz.
				152		Clayey Gravel(GC) Similar to above.
				153		
				154		
				155		
				156		Clay(CH) High plasticity, soft, dry, dark reddish brown - Dockum Formation.
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				158		
				159		
				160		
				161		BORING TERMINATED AT 160 FEET BELOW GRADE
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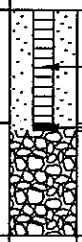

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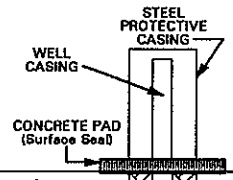
F-204A Austin (8-95)

WELL CONSTRUCTION LOG

WELL NO. MW-223

Client:		Start Date:	End Date:	Page of
Fina Oil and Chemical Co.		10-31-97	10-31-97	1 3
Site:		**Drilling Method:**		**Project Number:**
Northweast Boundary Investigation, Big Spring		Air/Wet Rotary		50-01858.26
Geologist:	**Driller:**	**Drill Rig Type:**		**Borehole Diameter:**
Tracy Payne	Choate Well Service	Failing 1000		6.75 Inches
Site Coordinates, UTM in ft.:	**Total Depth (ft-bgl):**	**Surface Elevation(ft)**	**TOC Elevation(ft)**	**PAD Elevation(ft)**
N: 246138.0300 E: 792439.7100	120.00		2505.30	2502.40
Datum Description Source:	**Datum Elev. (ft):**	**Water Level Depth Below Grade(ft):**	**Date:**	**Time:**

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				1–3		Sand(SP) Fine to very fine grained, subangular, loose, dry, dark brown, poorly graded.
				4–10		Clayey Sand(SM) 20-30% soft clay, fine grained sand, subangular, compact, dry, reddish brown.
				11–12		Caliche/Sand Mix Dense, moderately cemented, dry, light gray to white.
				13–19		Silty Sand(SM) Very fine grained, subangular, 20-30% silt, compact, dry, reddish tan.
				20–22		Caliche White, dense, dry.
				23–29		Silty Sand(SM) Fine to very fine grained, 20-30% silt fines, compact, dry, reddish tan, subrounded grains.
				30–39		Silty Sand(SM) Similar to above.
				40–49		Silty Sand(SM) Similar to above.



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F-204A Austin (8-95)

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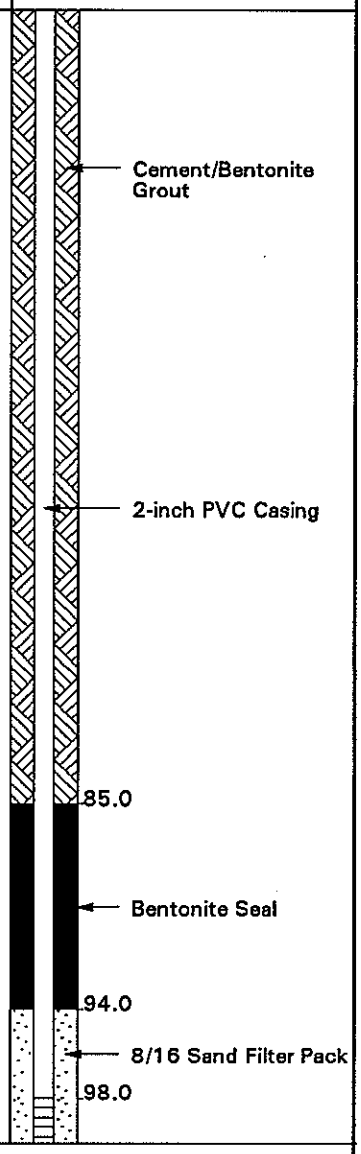
WELL CONSTRUCTION LOG

WELL NO. MW-223

Client:		Start Date:	End Date:	Page of
Fina Oil and Chemical Co.		10-31-97	10-31-97	2 3
Site:		**Drilling Method:**		**Project Number:**
Northweast Boundary Investigation, Big Spring		Air/Wet Rotary		50-01858.26
Geologist:	**Driller:**	**Drill Rig Type:**		**Borehole Diameter:**
Tracy Payne	Choate Well Service	Failing 1000		6.75 Inches
Site Coordinates, UTM in ft.:	**Total Depth (ft-bgl):**	**Surface Elevation(ft)**	**TOC Elevation(ft)**	**PAD Elevation(ft)**
N: 246138.0300 E: 792439.7100	120.00		2505.30	2502.40
Datum Description Source:	**Datum Elev. (ft):**	**Water Level Depth Below Grade(ft):**	**Date:**	**Time:**

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				51–99		Silty Sand(SM) fine to very fine grained, 20-30% silt fines, compact, dry, subrounded grains, grades to a light pinkish tan.
						Silty Sand(SM) Similar to above.
						Silty Sand(SM) Similar to above.
						Silty Sand(SM) Similar to above.
						Silty Sand(SM) Similar to above, saturated at 99 feet.



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F-204A Austin (8-95)

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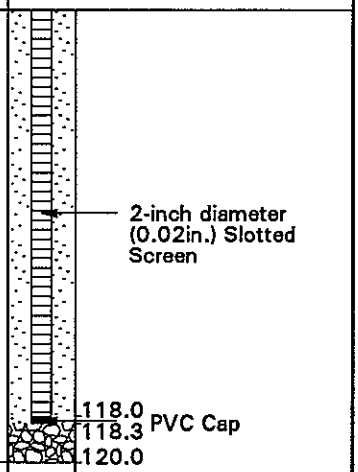
WELL CONSTRUCTION LOG

WELL NO. MW-223

Client:		Start Date:	End Date:	Page of
Fina Oil and Chemical Co.		10-31-97	10-31-97	3 3
Site:		Drilling Method:		Project Number:
Northwest Boundary Investigation, Big Spring		Air/Wet Rotary		50-01858.26
Geologist:	Driller:	Drill Rig Type:		Borehole Diameter:
Tracy Payne	Choate Well Service	Failing 1000		6.75 Inches
Site Coordinates, UTM in ft.:	Total Depth (ft-bgl):	Surface Elevation(ft)	TOC Elevation(ft)	PAD Elevation(ft)
N: 246138.0300 E: 792439.7100	120.00		2505.30	2502.40
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				101–120		Silty Sand(SM) Fine to very fine grained, 20-30% silt fines, compact, dry, pinkish tan, subrounded grains, saturated.
				101–120		Silty Sand(SM) Similar to above.
				120–149		BORING TERMINATED AT 120 FEET BELOW GRADE



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F-204A Austin (8-95)

WELL CONSTRUCTION LOG

WELL NO. MW-223A

Client:		Start Date:	End Date:	Page of
Fina Oil and Chemical Co.		10-30-97	10-30-97	1 4
Site:		**Drilling Method:**		**Project Number:**
Northweast Boundary Investigation, Big Spring		Air/Wet Rotary		50-01858.26
Geologist:	**Driller:**	**Drill Rig Type:**		**Borehole Diameter:**
Tracy Payne	Choate Well Service	Failing 1000		6.75 Inches
Site Coordinates, UTM in ft.:	**Total Depth (ft-bgl):**	**Surface Elevation(ft)**	**TOC Elevation(ft)**	**PAD Elevation(ft)**
N: 246140.8000 E: 792455.5500	150.00		2506.46	2503.74
Datum Description Source:	**Datum Elev. (ft):**	**Water Level Depth Below Grade(ft):**	**Date:**	**Time:**

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				1–49		Sand(SP) Very fine to fine grained, subangular, loose, dry, dark brown, poorly graded.
						Clayey Sand(SC) 20-30% soft clay, fine grained sand, subangular, compact, dry, reddish brown.
						Caliche/Sand Mix Dense, moderately cemented,dry, light gray to white.
						Silty Sand(SM) Very fine grained, subangular, 20-30% silt, compact, dry, reddish tan.
						Silty Sand(SM) Similar to above. Caliche White, dense, dry
						Silty Sand(SM) Similar to 20-21 feet interval.
						Silty Sand(SM) Fine grained, subrounded, poorly graded, 10-20% silt, compact, dry, tan.
						Silty Sand(SM) Similar to above.

STEEL PROTECTIVE CASING
WELL CASING
CONCRETE PAD (Surface Seal)
Cement/Bentonite Grout
2-inch PVC Casing

WELL 18586 1/13/98

F-204A Austin (8-95)

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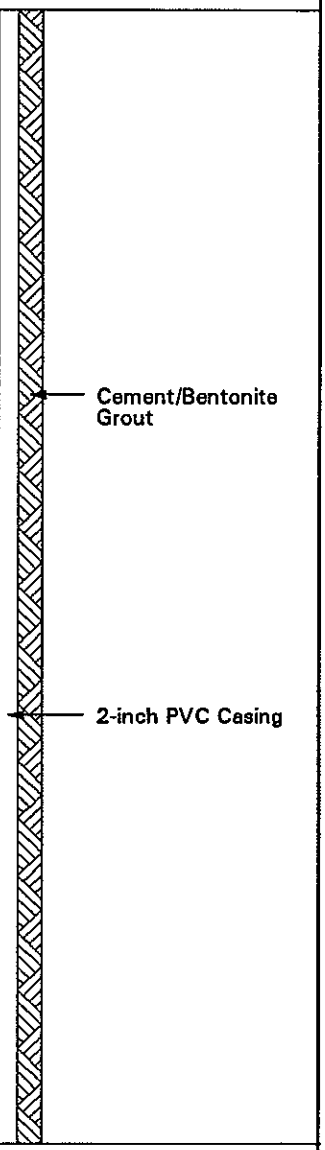
WELL CONSTRUCTION LOG

WELL NO. MW-223A

Client:		Start Date:	End Date:	Page of
Fina Oil and Chemical Co.		10-30-97	10-30-97	2 4
Site:		**Drilling Method:**		**Project Number:**
Northweast Boundary Investigation, Big Spring		Air/Wet Rotary		50-01858.26
Geologist:	**Driller:**	**Drill Rig Type:**		**Borehole Diameter:**
Tracy Payne	Choate Well Service	Failing 1000		6.75 Inches
Site Coordinates, UTM in ft.:	**Total Depth (ft-bgl):**	**Surface Elevation(ft)**	**TOC Elevation(ft)**	**PAD Elevation(ft)**
N: 246140.8000 E: 792455.5500	150.00		2506.46	2503.74
Datum Description Source:	**Datum Elev. (ft):**	**Water Level Depth Below Grade(ft):**	**Date:**	**Time:**

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				51–99		Silty Sand(SM) Fine grained, subrounded, poorly graded, 10-20% silt, compact, dry, pinkish tan.
						Silty Sand(SM) Similar to above.
						Silty Sand(SM) Similar to above, dry.
						Silty Sand(SM) Similar to above, dry.
						Silty Sand(SM) Similar to above, becoming damp at 90 feet. Moisture increases with depth.



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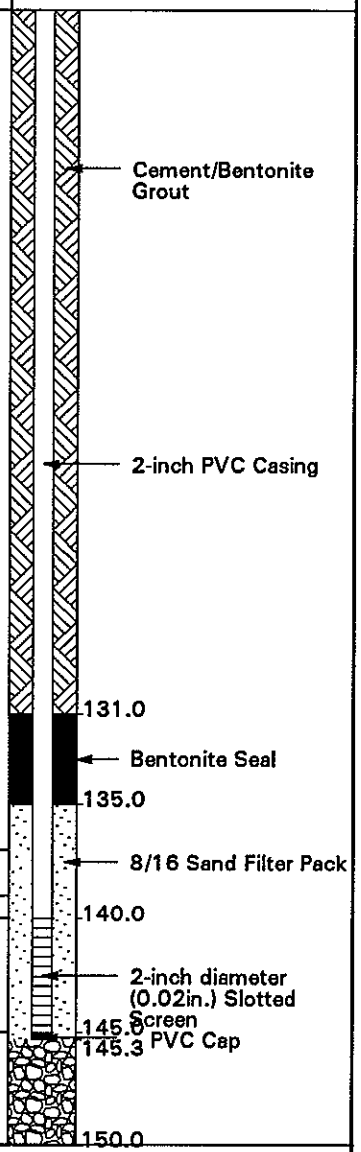
WELL CONSTRUCTION LOG

WELL NO. MW-223A

Client:		Start Date:	End Date:	Page of
Fina Oil and Chemical Co.		10-30-97	10-30-97	3 4
Site:		**Drilling Method:**		**Project Number:**
Northweast Boundary Investigation, Big Spring		Air/Wet Rotary		50-01858.26
Geologist:	**Driller:**	**Drill Rig Type:**		**Borehole Diameter:**
Tracy Payne	Choate Well Service	Failing 1000		6.75 Inches
Site Coordinates, UTM in ft.:	**Total Depth (ft-bgl):**	**Surface Elevation(ft)**	**TOC Elevation(ft)**	**PAD Elevation(ft)**
N: 246140.8000 E: 792455.5500	150.00		2506.46	2503.74
Datum Description Source:	**Datum Elev. (ft):**	**Water Level Depth Below Grade(ft):**	**Date:**	**Time:**

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
		▽		101–149		Silty Sand(SM) Fine grained, subrounded, poorly graded, 10-20% silt, compact, pinkish tan, saturated at 101 feet.
						Silty Sand(SM) Similar to above.
						Silty Sand(SM) Similar to above.
						Silty Sand(SM) Similar to above.
						Clay(CL) Low plasticity, soft, slightly sandy, light reddish brown, saturated.
						Gravel(GP) Large granules, loose, saturated, poorly graded, chert, quartz, shell fragments, subangular.
						Gravel(GP) Similar to above.
						Clay(CH) Moderate to high plasticity, firm, dry, dark reddish brown/gray, Dockum Formation.



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F-204A Austin (8-95)

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WELL CONSTRUCTION LOG

WELL NO. MW-223A

Client:		Start Date:	End Date:	Page of
Fina Oil and Chemical Co.		10-30-97	10-30-97	4 4
Site:		Drilling Method:		Project Number:
Northweast Boundary Investigation, Big Spring		Air/Wet Rotary		50-01858.26
Geologist:	Driller:	Drill Rig Type:		Borehole Diameter:
Tracy Payne	Choate Well Service	Failing 1000		6.75 Inches
Site Coordinates, UTM in ft.:	Total Depth (ft-bgl):	Surface Elevation(ft)	TOC Elevation(ft)	PAD Elevation(ft)
N: 246140.8000 E: 792455.5500	150.00		2506.46	2503.74
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				151		BORING TERMINATED AT 150 FEET BELOW GRADE
				152		
				153		
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WELL 18586 1/13/98

F-204A Austin (8-95)

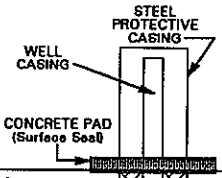
WELL CONSTRUCTION LOG

WELL NO. MW-224

Client: Fina Oil and Chemical Co.	Start Date: 11-17-97	End Date: 11-17-97	Page 1 of 3
Site: Northweast Boundary Investigation, Big Spring	Drilling Method: Air/Wet Rotary		Project Number: 50-01858.26
Geologist: Tracy Payne	Driller: Choate Well Service	Drill Rig Type: Failing 1000	Borehole Diameter: 6.75 Inches
Site Coordinates, UTM in ft.: N: 246794.5100 E: 792342.8700	Total Depth (ft-bgl): 140.00	Surface Elevation(ft)	TOC Elevation(ft): 2521.92 / PAD Elevation(ft): 2519.03
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date: / Time:

Sample Type | Recovery (%) | Saturation | PID (ppm) | Depth (feet) | Stratigraphy

LITHOLOGIC DESCRIPTION



Sand(SP) Fine to very fine grained, subrounded, poorly graded, loose, dry, dark brown.

Clayey Sand(SC) 10-20% clay, soft, fine grained sand, subrounded, compact, damp, reddish brown.

Clayey Sand(SC) Similar to above.

Silty Sand(SM) Fine grained, subrounded, loose, damp, tan, 20% silt.

Silty Sand(SM) Similar to above.

Silty Sand(SM) Similar to above, except reddish tan, 20-30% silt, damp.

Silty Sand(SM) Similar to above, damp.

Silty Sand(SM) Similar to above, increase in silt (40-50%) with very fine grained sand, damp.

Cement/Bentonite Grout

2-inch PVC Casing

WELL 18586 1/13/98

F-204A Austin (8-95)

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WELL CONSTRUCTION LOG

WELL NO. MW-224

Client:		Start Date:	End Date:	Page of
Fina Oil and Chemical Co.		11-17-97	11-17-97	2 3
Site:		**Drilling Method:**		**Project Number:**
Northweast Boundary Investigation, Big Spring		Air/Wet Rotary		50-01858.26
Geologist:	**Driller:**	**Drill Rig Type:**		**Borehole Diameter:**
Tracy Payne	Choate Well Service	Failing 1000		6.75 Inches
Site Coordinates, UTM in ft.:	**Total Depth (ft-bgl):**	**Surface Elevation(ft)**	**TOC Elevation(ft)**	**PAD Elevation(ft)**
N: 246794.5100 E: 792342.8700	140.00		2521.92	2519.03
Datum Description Source:	**Datum Elev. (ft):**	**Water Level Depth Below Grade(ft):**	**Date:**	**Time:**

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				51–99		Silty Sand(SM) Fine grained sand, subrounded, loose, damp, reddish tan, decrease in silt 20-30%.
						Silty Sand(SM) Similar to above, dry, pinkish tan.
						Silty Sand(SM) Similar to above.
						Silty Sand(SM) Similar to above, occasional sandstone seams.
						Silty Sand(SM) Similar to above, damp at 100 feet.

Cement/Bentonite Grout

2-inch PVC Casing

WELL 18686 1/13/98

F-204A Austin (8-95)

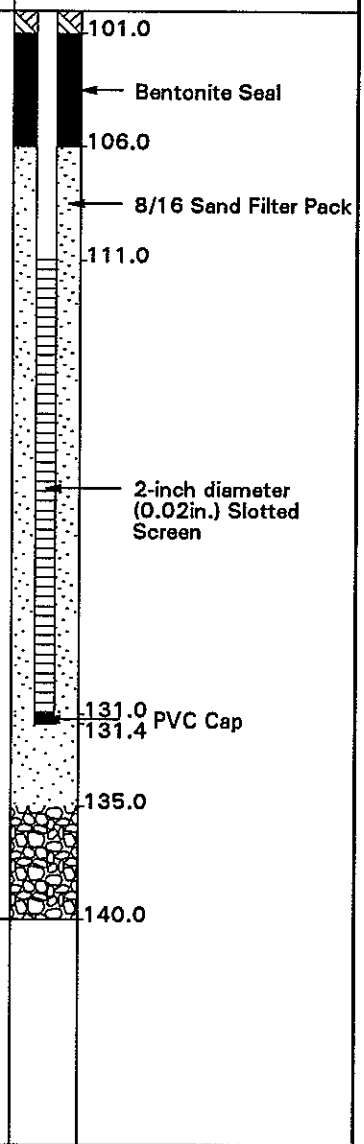
Continued Next Page

WELL CONSTRUCTION LOG

WELL NO. MW-224

Client: Fina Oil and Chemical Co.	Start Date: 11-17-97	End Date: 11-17-97	Page 3 of 3
Site: Northweast Boundary Investigation, Big Spring	Drilling Method: Air/Wet Rotary		Project Number: 50-01858.26
Geologist: Tracy Payne	Driller: Choate Well Service	Drill Rig Type: Failing 1000	Borehole Diameter: 6.75 Inches
Site Coordinates, UTM in ft.: N: 246794.5100 E: 792342.8700	Total Depth (ft-bgl): 140.00	Surface Elevation(ft)	TOC Elevation(ft): 2521.92 / PAD Elevation(ft): 2519.03
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date: / Time:

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				101–140		Silty Sand(SM) Fine grained sand, subrounded, loose, damp, pinkish tan, 20-30% silt.
		▽		111–140		Silty Sand(SM) Similar to above, moist to saturated at 112 feet.
				121–140		Silty Sand(SM) Similar to above.
				131–140		Silty Sand(SM) Similar to above.
				140		BORING TERMINATED AT 140 FEET BELOW GRADE



WELL 18586 1/13/98

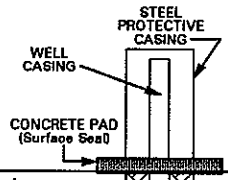
F-204A Austin (8-95)

WELL CONSTRUCTION LOG

WELL NO. MW-224A

Client:		Start Date:	End Date:	Page of
Fina Oil and Chemical Co.		10-29-97	10-29-97	1 4
Site:		**Drilling Method:**		**Project Number:**
Northweast Boundary Investigation, Big Spring		Air/Wet Rotary		50-01858.26
Geologist:	**Driller:**	**Drill Rig Type:**		**Borehole Diameter:**
Tracy Payne	Choate Well Service	Failing 1000		6.75 Inches
Site Coordinates, UTM in ft.:	**Total Depth (ft-bgl):**	**Surface Elevation(ft)**	**TOC Elevation(ft)**	**PAD Elevation(ft)**
N: 246787.8600 E: 792356.7400	160.00		2521.54	2518.68
Datum Description Source:	**Datum Elev. (ft):**	**Water Level Depth Below Grade(ft):**	**Date:**	**Time:**

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				1–49		Sand(SP) Fine to very fine grained, subrounded, poorly graded, loose, dry, dark brown.
						Clayey Sand(SC) 10-20% clay, soft, fine grained sand, subrounded, compact, damp, reddish brown.
						Clayey Sand(SC) Similar to above.
						Silty Sand(SM) Fine grained, subrounded, loose, damp, tan, 20% silt.
						Silty Sand(SM) Similar to above.
						Silty Sand(SM) Similar to above, except reddish tan, 20-30% silt, damp.
						Silty Sand(SM) Similar to above, damp.
						Silty Sand(SM) Similar to above, increase in silt 40-50% with very fine grained sand, damp.



WELL 18586 1/13/98

F-204A Austin (8-95)

Continued Next Page

WELL CONSTRUCTION LOG

WELL NO. MW-224A

Client:		Start Date:	End Date:	Page of
Fina Oil and Chemical Co.		10-29-97	10-29-97	2 4
Site:		Drilling Method:		Project Number:
Northweast Boundary Investigation, Big Spring		Air/Wet Rotary		50-01858.26
Geologist:	Driller:	Drill Rig Type:		Borehole Diameter:
Tracy Payne	Choate Well Service	Failing 1000		6.75 Inches
Site Coordinates, UTM in ft.:	Total Depth (ft-bgl):	Surface Elevation(ft)	TOC Elevation(ft)	PAD Elevation(ft)
N: 246787.8600 E: 792356.7400	160.00		2521.54	2518.68
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				51–99		Silty Sand(SM) Fine grained, subrounded, loose, damp, reddish tan, 20-30% silt.
						Silty Sand(SM) Similar to above, dry, pinkish tan.
						Silty Sand(SM) Similar to above.
						Silty Sand(SM) Similar to above, occasional sandstone seams.
						Silty Sand(SM) Similar to above, damp at 100 feet.

Cement/Bentonite Grout

2-inch PVC Casing

WELL 18586 1/13/98

F-204A Austin (8-95)

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WELL CONSTRUCTION LOG

WELL NO. MW-224A

Client:		Start Date:	End Date:	Page of
Fina Oil and Chemical Co.		10-29-97	10-29-97	3 4
Site:		**Drilling Method:**		**Project Number:**
Northwest Boundary Investigation, Big Spring		Air/Wet Rotary		50-01858.26
Geologist:	**Driller:**	**Drill Rig Type:**		**Borehole Diameter:**
Tracy Payne	Choate Well Service	Failing 1000		6.75 Inches
Site Coordinates, UTM in ft.:	**Total Depth (ft-bgl):**	**Surface Elevation(ft)**	**TOC Elevation(ft)**	**PAD Elevation(ft)**
N: 246787.8600 E: 792356.7400	160.00		2521.54	2518.68
Datum Description Source:	**Datum Elev. (ft):**	**Water Level Depth Below Grade(ft):**	**Date:**	**Time:**

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				101–149		Silty Sand(SM) Fine grained, subrounded, loose, damp, pinkish tan, 20-30% silt.
						Silty Sand(SM) Similar to above, moist at 118 feet.
						Silty Sand(SM) Similar to above, saturated at 120 feet.
						Silty Sand(SM) Similar to above.
						Silty Sand(SM) Similar to above.
						Clay(CL) Low plasticity, soft, saturated, reddish brown, slightly sandy.

Cement/Bentonite Grout

2-inch PVC Casing

143.0

Bentonite Seal

147.5

8/16 Sand Filter Pack

WELL 18586 1/13/98

F-204A Austin (8-95)

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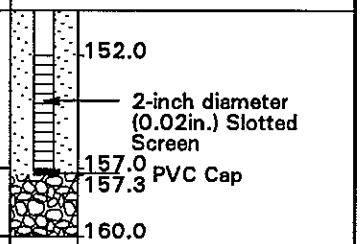
WELL CONSTRUCTION LOG

WELL NO. MW-224A

Client:		Start Date:	End Date:	Page of
Fina Oil and Chemical Co.		10-29-97	10-29-97	4 4
Site:		**Drilling Method:**		**Project Number:**
Northweast Boundary Investigation, Big Spring		Air/Wet Rotary		50-01858.26
Geologist:	**Driller:**	**Drill Rig Type:**		**Borehole Diameter:**
Tracy Payne	Choate Well Service	Failing 1000		6.75 Inches
Site Coordinates, UTM in ft.:	**Total Depth (ft-bgl):**	**Surface Elevation(ft)**	**TOC Elevation(ft)**	**PAD Elevation(ft)**
N: 246787.8600 E: 792356.7400	160.00		2521.54	2518.68
Datum Description Source:	**Datum Elev. (ft):**	**Water Level Depth Below Grade(ft):**	**Date:**	**Time:**

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				151–160		Gravel(GP) Poorly graded, granule to small pebbles, compact, saturated, chert, quartz - subangular to angular.
				157–160		Clay(CH) Moderate to high plasticity, soft, dry, dark reddish brown/gray - Dockum Formation.
				160		BORING TERMINATED AT 160 FEET BELOW GRADE



WELL 18586 1/13/98

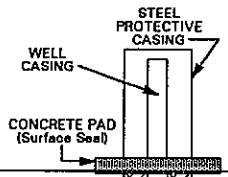
F-204A Austin (8-95)

WELL CONSTRUCTION LOG

WELL NO. MW-225

Client:		Start Date:	End Date:	Page of
Fina Oil and Chemical Co.		11-21-97	11-21-97	1 3
Site:		Drilling Method:		Project Number:
Northwest Boundary Investigation Big Spring		Air/Wet Rotary		50-01858.27
Geologist:	Driller:	Drill Rig Type:		Borehole Diameter:
Tracy Payne	Choate Well Service	Failing 1000		6.75 Inches
Site Coordinates, UTM in ft.:	Total Depth (ft-bgl):	Surface Elevation(ft)	TOC Elevation(ft)	PAD Elevation(ft)
N: 243803.0900 E: 787714.5800	100.00		2476.92	2474.36
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				1–49		Silty Sand(SM) Fine grained, poorly graded, subrounded, compact, damp to dry, brown, 10-20% silt.
						Silty Sand(SM) Similar to above, tan, 30-40% silt, very fine grained sand.
						Silty Sand(SM) Similar to above, light tan, sandstone seam 19-20 feet, moderately to well cemented.
						Silty Sand(SM) Similar to above, dry.
						Silty Sand(SM) 10-20% silt, compact, grades to a light pinkish tan, poorly graded, dry.
						Silty Sand(SM) Similar to above.



WELL 18587 1/13/98

F-204A Austin (8-95)

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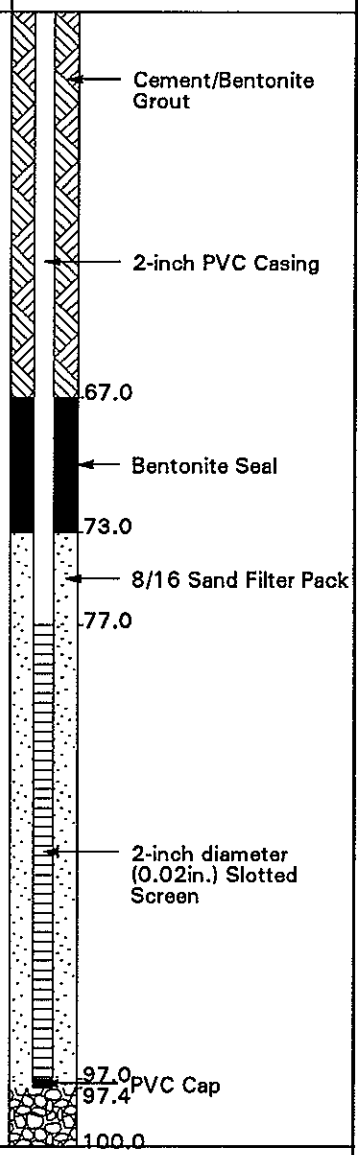
WELL CONSTRUCTION LOG

WELL NO. MW-225

Client: Fina Oil and Chemical Co.		Start Date: 11-21-97	End Date: 11-21-97	Page 2 of 3
Site: Northwest Boundary Investigation Big Spring		Drilling Method: Air/Wet Rotary		Project Number: 50-01858.27
Geologist: Tracy Payne	Driller: Choate Well Service	Drill Rig Type: Failing 1000		Borehole Diameter: 6.75 Inches
Site Coordinates, UTM in ft.: N: 243803.0900 E: 787714.5800	Total Depth (ft-bgl): 100.00	Surface Elevation(ft)	TOC Elevation(ft) 2476.92	PAD Elevation(ft) 2474.36
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				51–99		Silty Sand(SM) 10-20% silt, compact, grades to a light pinkish tan, poorly graded, dry.
						Silty Sand(SM) Similar to above, damp to moist.
						Silty Sand(SM) Similar to above, saturated at 78 feet.
						Silty Sand(SM) Similar to above, saturated.
						Silty Sand(SM) Similar to above, saturated.



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F-204A Austin (8-95)

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WELL CONSTRUCTION LOG

WELL NO. MW-225

Client:		Start Date:	End Date:	Page of
Fina Oil and Chemical Co.		11-21-97	11-21-97	3 3
Site:		Drilling Method:		Project Number:
Northwest Boundary Investigation Big Spring		Air/Wet Rotary		50-01858.27
Geologist:	Driller:	Drill Rig Type:		Borehole Diameter:
Tracy Payne	Choate Well Service	Failing 1000		6.75 Inches
Site Coordinates, UTM in ft.:	Total Depth (ft-bgl):	Surface Elevation(ft)	TOC Elevation(ft)	PAD Elevation(ft)
N: 243803.0900 E: 787714.5800	100.00		2476.92	2474.36
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149		BORING TERMINATED AT 100 FEET BELOW GRADE

WELL 18587 1/13/98

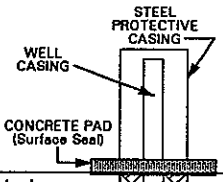
F-204A Austin (8-95)

WELL CONSTRUCTION LOG

WELL NO. MW-225A

Client:		Start Date:	End Date:	Page of
Fina Oil and Chemical Co.		11-21-97	11-21-97	1 3
Site:		Drilling Method:		Project Number:
Northwest Boundary Investigation Big Spring		Air/Wet Rotary		50-01858.27
Geologist:	Driller:	Drill Rig Type:		Borehole Diameter:
Tracy Payne	Choate Well Service	Failing 1000		6.75 Inches
Site Coordinates, UTM in ft.:	Total Depth (ft-bgl):	Surface Elevation(ft)	TOC Elevation(ft)	PAD Elevation(ft)
N: 243815.7700 E: 787711.8900	115.00		2477.25	2474.42
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				1–49		Silty Sand(SM) Fine grained, poorly graded, subrounded, compact, damp to dry, brown, 10-20% silt.
						Silty Sand(SM) Similar to above, tan, 30-40% silt, very fine grained sand.
						Silty Sand(SM) Similar to above, light tan, sandstone seam about 14-20 feet, not well cemented.
						Silty Sand(SM) Similar to above, dry.
						Silty Sand(SM) Compact, 10-20% silt, dry, grades to a light pinkish tan, poorly graded.
						Silty Sand(SM) Similar to above.



Cement/Bentonite Grout

2-inch PVC Casing

WELL 18587 1/13/98

F-204A Austin (8-95)

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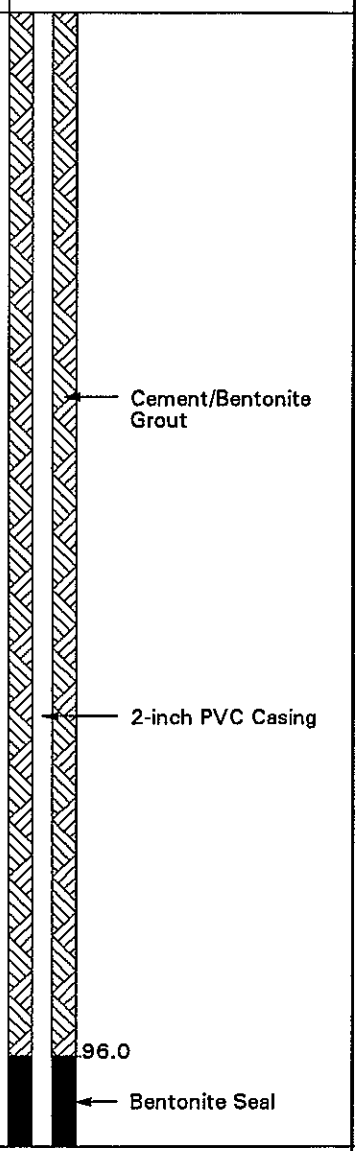
WELL CONSTRUCTION LOG

WELL NO. MW-225A

Client: Fina Oil and Chemical Co.		Start Date: 11-21-97	End Date: 11-21-97	Page 2 of 3
Site: Northwest Boundary Investigation Big Spring		Drilling Method: Air/Wet Rotary		Project Number: 50-01858.27
Geologist: Tracy Payne	Driller: Choate Well Service	Drill Rig Type: Failing 1000		Borehole Diameter: 6.75 Inches
Site Coordinates, UTM in ft.: N: 243815.7700 E: 787711.8900	Total Depth (ft-bgl): 115.00	Surface Elevation(ft)	TOC Elevation(ft) 2477.25	PAD Elevation(ft) 2474.42
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				51–99		Silty Sand(SM) Compact, 10-20% silt, dry, grades to a light pinkish tan, poorly graded.
						Silty Sand(SM) Similar to above, damp to moist.
						Silty Sand(SM) Similar to above, saturated at 78 feet.
						Silty Sand(SM) Similar to above, saturated.
						Silty Sand(SM) Similar to above, saturated.



WELL 18587 1/13/98

F-204A Austin (8-95)

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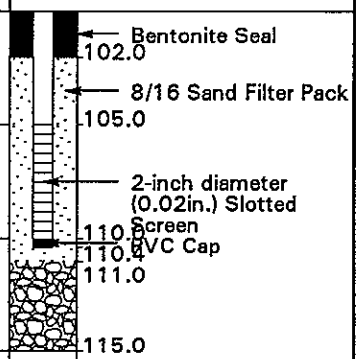
WELL CONSTRUCTION LOG

WELL NO. MW-225A

Client: Fina Oil and Chemical Co.	Start Date: 11-21-97	End Date: 11-21-97	Page 3 of 3
Site: Northwest Boundary Investigation Big Spring	Drilling Method: Air/Wet Rotary		Project Number: 50-01858.27
Geologist: Tracy Payne	Driller: Choate Well Service	Drill Rig Type: Failing 1000	Borehole Diameter: 6.75 Inches
Site Coordinates, UTM in ft.: N: 243815.7700 E: 787711.8900	Total Depth (ft-bgl): 115.00	Surface Elevation(ft)	TOC Elevation(ft): 2477.25 / PAD Elevation(ft): 2474.42
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date: / Time:

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				101–105		Silty Sand(SM) Compact, 10-20% silt, saturated, light pinkish tan, poorly graded.
				105–110		Sandy Gravel(GP) Poorly graded, subrounded, granular to pebble-sized gravel with fine to medium grained sand, compact, chert and quartz, saturated.
				110–115		Clay(CH) Moderate to high plasticity, firm, dry, dark reddish brown, Dockum Formation.
				115		BORING TERMINATED AT 100 FEET BELOW GRADE



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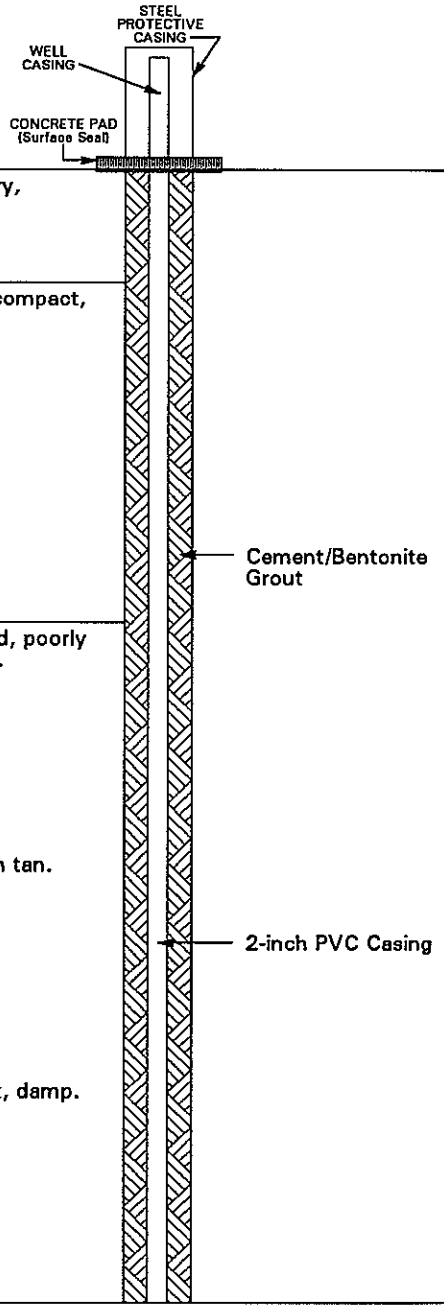
F-204A Austin (8-95)

WELL CONSTRUCTION LOG

WELL NO. MW-227

Client:		Start Date:	End Date:	Page of
Fina Oil and Chemical Co.		11-19-97	11-19-97	1 3
Site:		Drilling Method:		Project Number:
Northwest Boundary Investigation, Big Spring		Air/Wet Rotary		50-01858.27
Geologist:	Driller:	Drill Rig Type:		Borehole Diameter:
Tracy Payne	Choate Well Service	Failing 1000		6.75 Inches
Site Coordinates, UTM in ft.:	Total Depth (ft-bgl):	Surface Elevation(ft)	TOC Elevation(ft)	PAD Elevation(ft)
N: 245006.5800 E: 787568.8900	110.00		2486.14	2483.62
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				1–4		Sand(SP) Fine, loose, subrounded, poorly graded, dry, brown.
				5–19		Clayey Sand(SC) Fine, subrounded, poorly graded, compact, 20% clay, dry, reddish brown.
				10–19		Clayey Sand(SC) Similar to above.
				20–40		Silty Sand(SM) Very fine to fine grained, subrounded, poorly graded, loose, dry, tan, 30-40% silt.
				30–40		Silty Sand(SM) Similar to above, except light reddish tan.
				41–49		Silty Sand(SM) Similar to above, except 10-20% silt, damp.



WELL 18586 1/13/98

F-204A Austin (8-95)

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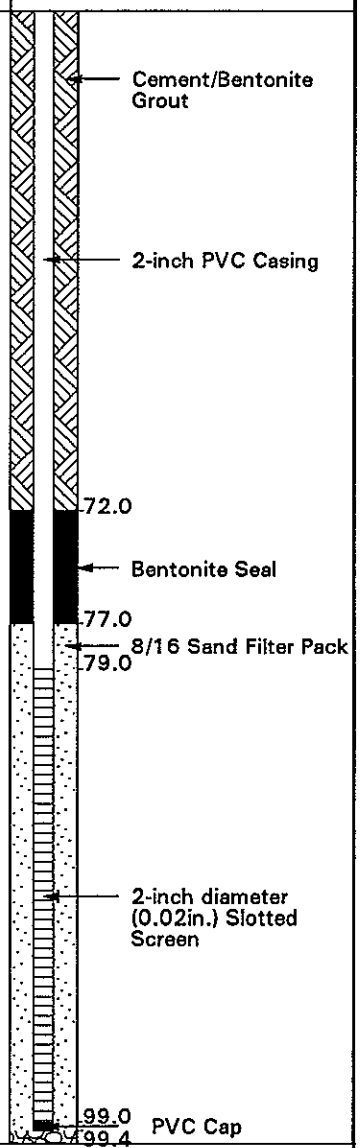
WELL CONSTRUCTION LOG

WELL NO. MW-227

Client:		Start Date:	End Date:	Page of
Fina Oil and Chemical Co.		11-19-97	11-19-97	2 3
Site:		Drilling Method:		Project Number:
Northwest Boundary Investigation, Big Spring		Air/Wet Rotary		50-01858.27
Geologist:	Driller:	Drill Rig Type:		Borehole Diameter:
Tracy Payne	Choate Well Service	Failing 1000		6.75 Inches
Site Coordinates, UTM in ft.:	Total Depth (ft-bgl):	Surface Elevation(ft)	TOC Elevation(ft)	PAD Elevation(ft)
N: 245006.5800 E: 787568.8900	110.00		2486.14	2483.62
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				51–99		Silty Sand(SM) Very fine to fine grained, subrounded, poorly graded, loose, damp, light reddish tan, 10-20% silt.
						Silty Sand(SM) Similar to above, damp.
						Silty Sand(SM) Similar to above.
		▽				Silty Sand(SM) Similar to above, odor, saturated at 80 feet.
						Silty Sand(SM) Similar to above, odor, saturated.



WELL 18586 1/13/98

F-204A Austin (8-95)

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WELL CONSTRUCTION LOG

WELL NO. MW-227

Client:		Start Date:	End Date:	Page of
Fina Oil and Chemical Co.		11-19-97	11-19-97	3 3
Site:		Drilling Method:		Project Number:
Northwest Boundary Investigation, Big Spring		Air/Wet Rotary		50-01858.27
Geologist:	Driller:	Drill Rig Type:		Borehole Diameter:
Tracy Payne	Choate Well Service	Failing 1000		6.75 Inches
Site Coordinates, UTM in ft.:	Total Depth (ft-bgl):	Surface Elevation(ft)	TOC Elevation(ft)	PAD Elevation(ft)
N: 245006.5800 E: 787568.8900	110.00		2486.14	2483.62
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION	
				101 102 103 104 105 106 107 108 109 110		Silty Sand(SM) Very fine to fine grained, subrounded, poorly graded, loose, saturated, odor, light reddish tan, 10-20% silt.	110.0
				111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149		BORING TERMINATED AT 110 FEET BELOW GRADE	

WELL 18586 1/13/98

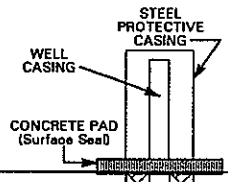
F-204A Austin (8-95)

WELL CONSTRUCTION LOG

WELL NO. MW-227A

Client:		Start Date:	End Date:	Page of
Fina Oil and Chemical Co.		10-27-97	10-27-97	1 3
Site:		Drilling Method:		Project Number:
Northwest Boundary Investigation Big Spring		Air/Wet Rotary		50-01858.27
Geologist:	Driller:	Drill Rig Type:		Borehole Diameter:
Tracy Payne	Choate Well Service	Failing 1000		6.75 Inches
Site Coordinates, UTM in ft.:	Total Depth (ft-bgl):	Surface Elevation(ft)	TOC Elevation(ft)	PAD Elevation(ft)
N: 245019.4300 E: 787559.6600	128.00		2486.81	2484.01
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				1–4		Sand(SP) Fine, loose, subrounded, poorly graded, dry, brown.
				5–19		Clayey Sand(SC) Fine, subrounded, poorly graded, compact, 20% clay, dry, reddish brown.
				10–19		Clayey Sand(SC) Similar to above.
				20–39		Silty Sand(SM) Very fine to fine grained, subrounded, poorly graded, loose, dry, tan, 30-40% silt.
				30–39		Silty Sand(SM) Similar to above, except light reddish tan.
				40–49		Silty Sand(SM) Similar to above, except 10-20% silt, damp.



Cement/Bentonite Grout

2-inch PVC Casing

WELL 18587 1/13/98

F-204A Austin (8-95)

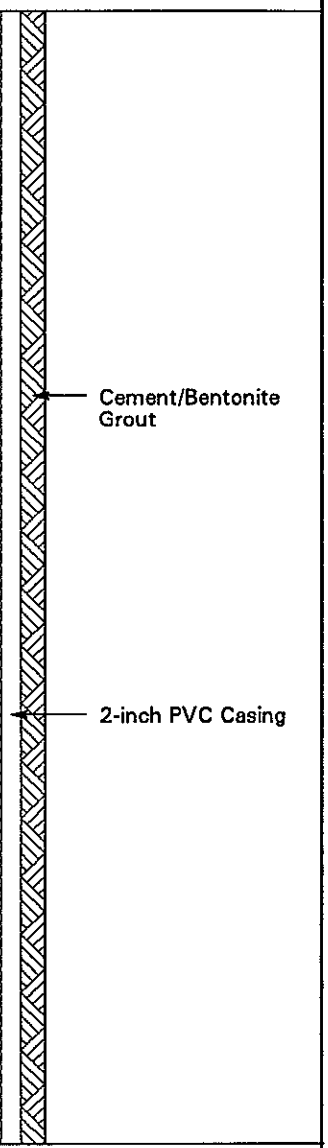
Continued Next Page

WELL CONSTRUCTION LOG

WELL NO. MW-227A

Client:		Start Date:	End Date:	Page of
Fina Oil and Chemical Co.		10-27-97	10-27-97	2 3
Site:		Drilling Method:		Project Number:
Northwest Boundary Investigation Big Spring		Air/Wet Rotary		50-01858.27
Geologist:	Driller:	Drill Rig Type:		Borehole Diameter:
Tracy Payne	Choate Well Service	Failing 1000		6.75 Inches
Site Coordinates, UTM in ft.:	Total Depth (ft-bgl):	Surface Elevation(ft)	TOC Elevation(ft)	PAD Elevation(ft)
N: 245019.4300 E: 787559.6600	128.00		2486.81	2484.01
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				51–99		Silty Sand(SM) Very fine to fine grained, subrounded, poorly graded, loose, damp, light reddish tan, 10-20% silt.
						Silty Sand(SM) Similar to above, damp.
						Silty Sand(SM) Similar to above.
						Silty Sand(SM) Similar to above, odor, saturation at 83 feet.
						Silty Sand(SM) Similar to above, odor, saturated.



WELL 18587 1/13/98

F-204A Austin (8-95)

Continued Next Page

WELL CONSTRUCTION LOG

WELL NO. MW-227A

Client: Fina Oil and Chemical Co.		Start Date: 10-27-97	End Date: 10-27-97	Page 3 of 3
Site: Northwest Boundary Investigation Big Spring		Drilling Method: Air/Wet Rotary		Project Number: 50-01858.27
Geologist: Tracy Payne	Driller: Choate Well Service	Drill Rig Type: Failing 1000		Borehole Diameter: 6.75 Inches
Site Coordinates, UTM in ft.: N: 245019.4300 E: 787559.6600	Total Depth (ft-bgl): 128.00	Surface Elevation(ft)	TOC Elevation(ft) 2486.81	PAD Elevation(ft) 2484.01
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (%)	Saturation	PID (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				101–114		Silty Sand(SM) Very fine to fine grained, subrounded, poorly graded, loose, saturated, light reddish tan, 10-20% silt.
				111–114		Silty Sand(SM) Similar to above.
				114–117		Clay(CL) Low plasticity, soft, saturated, reddish brown, slightly sandy.
				117–124		Sandy Gravel(GW) 10-20% fine grained sand. Gravel - well graded, granule to pebble, subrounded to subangular, loose, saturated, chert, quartz, shell fragments.
				121–124		Sandy Gravel(GW) Similar to above.
				124–128		Clay(CH) High plasticity, stiff, dry, dark reddish brown, Dockum Formation.
				128		BORING TERMINATED AT 128 FEET BELOW GRADE

Cement/Bentonite Grout

112.5

Bentonite Seal

115.5

8/16 Sand Filter Pack

119.0

2-inch diameter (0.02in.) Slotted Screen

124.0

124.3 PVC Cap

128.0

WELL 18587 1/13/98

F-204A Austin (8-95)

Client: Cosden Oil and Chemical Co. Job No: 435505

Project: Groundwater Quality Assessment Program Well No. P-3

Well Location: Approximately 100 feet south of propane storage tank B-6 and southeast of flare.

Date Installed: February 18, 1984 By: Hi Plains Drilling, Inc.

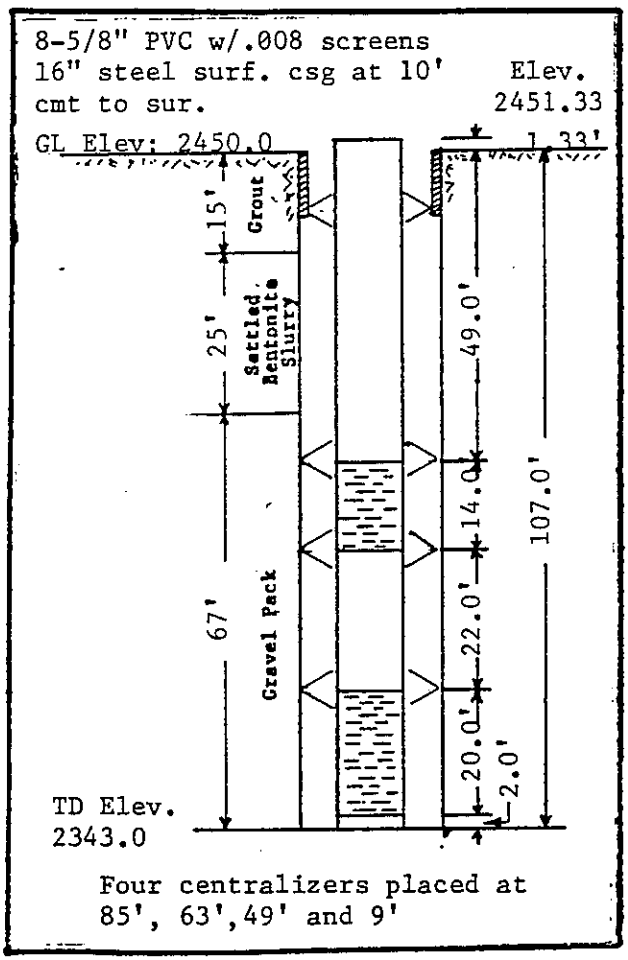
Inspector: Louis R. Reeder

Casing Shoe: 107.0' (2343')

Height of Casing Above GL: 1.33 (2451.33') GL Elev: 2450.0

Static Water Level: 58.958 Elev: 2392.37

Cover Assembly Type: 8" PVC slip on cap



Comments: 4-3/4" Pilot hole drilled on February 15, 1984. It was decided that the well was to be the production well and was left uncased until a reverse circulating rig could be moved on to ream the hole to 15 inches. The reverse circulating rig moved on and reamed the hole on February 18, 1984. 16" steel surface casing was set and cemented at 10 feet. 8" PVC was set to 107 feet. A drawdown test was run February 21-23, 1984. Pit was filled and a 4' x 4' concrete pad is to be set around the well head.

Subsoil at Casing Shoe: Red shale - Dockum group. Contact at 105' (2345.0). 12 feet of Ogallala gravel overlies Dockum contact.

Williams Brothers Engineering Company

PUMPING WELL INSTALLATION RECORD

Date 4/19/84

Approved

Figure

P-3

Send original copy by certified mail to the Texas Department of Water Resources P. O. Box 13087 Austin, Texas 78711

State of Texas
WATER WELL REPORT

ATTENTION OWNER: *Confidentiality Privilege Notice on Reverse Side*

For TDWR use only
Well No.
Located on map
Received:

1) OWNER Cosden Oil & Chemical (Name) Address P.O. Box 1311 (Street or RFD) Big Spring, Texas 79720 (City) (State) (Zip)

2) LOCATION OF WELL: County Howard 3 miles in E (N.E., S.W., etc.) direction from Big Spring (Town)

Driller must complete the legal description to the right with distance and direction from two intersecting section or survey lines, or he must locate and identify the well on an official Quarter- or Half-Scale Texas County General Highway Map and attach the map to this form.

☒ Legal description:
Section No. 47 Block No. 32 Township
Abstract No. Survey Name T & P RR
Distance and direction from two intersecting section or survey lines NW
☐ See attached map.

3) TYPE OF WORK (Check): ☒ New Well ☐ Deepening ☐ Reconditioning ☐ Plugging

4) PROPOSED USE (Check): ☐ Domestic ☐ Industrial ☐ Public Supply ☐ Irrigation ☒ Test Well ☐ Other

5) DRILLING METHOD (Check): ☐ Mud Rotary ☐ Air Hammer ☐ Driven ☐ Bored ☐ Air Rotary ☐ Cable Tool ☐ Jetted ☒ Other reverse

6) WELL LOG:

Date drilled 2/18/84

DIAMETER OF HOLE Dia. (in.)	From (ft.)	To (ft.)
20	Surface	10
15	10	107

7) BOREHOLE COMPLETION: ☐ Open Hole ☒ Straight Wall ☐ Underreamed ☒ Gravel Packed ☐ Other
If Gravel Packed give interval . . . from 40 ft. to 107 ft.

From (ft.)	To (ft.)	Description and color of formation material
0 - 3		soil
3 - 8		caliche
8 - 74		sand and sandstone
74 - 82		sandstone with sand streaks
82 - 89		sand with streaks of sandstone
89 - 93		sandy clay
93 - 105		sand and gravel
105 - 107		red bed

8) CASING, BLANK PIPE, AND WELL SCREEN DATA:

Dia. (in.)	New or Used	Steel, Plastic, etc. Perf., Slotted, etc. Screen Mfr., if commercial	Setting (ft.) From	Setting (ft.) To	Gage Casing Screen
16		blank steel	0	10	.219
8-5/8		PVC blank	+1½	49	.410
8-5/8		PVC slotted	49	63	.030
8-5/8		PVC blank	63	85	.410
8-5/8		PVC slotted	85	105	.030
8-5/8		PVC blank	105	107	.410

CEMENTING DATA
Cemented from 0 ft. to 10 ft.
Method used trieme
Cemented by Hi Plains Drilling, Inc. (Company or Individual)

9) WATER LEVEL:
Static level 57 ft. below land surface Date 2/18/84
Artesian flow gpm. Date

10) PACKERS: Type Depth

11) TYPE PUMP:
☐ Turbine ☐ Jet ☐ Submersible ☐ Cylinder ☐ Other
Depth to pump bowls, cylinder, jet, etc., ft.

12) WELL TESTS:
☐ Type Test: ☐ Pump ☐ Bailer ☐ Jetted ☐ Estimated
Yield: gpm with ft. drawdown after hrs.

(Use reverse side if necessary)

13) WATER QUALITY:
Did you knowingly penetrate any strata which contained undesirable water? ☐ Yes ☒ No
If yes, submit "REPORT OF UNDESIRABLE WATER"
Type of water? Depth of strata
Was a chemical analysis made? ☐ Yes ☒ No

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief.

NAME Carlos V. Corcstiza (Type or Print) Water Well Drillers Registration No. 2171

ADDRESS P. O. Box 730 (Street or RFD) Abernathy (City) Texas (State) 79311 (Zip)

(Signed) (Water Well Driller) Hi Plains Drilling, Inc. (Company Name)

Please attach electric log, chemical analysis, and other pertinent information, if available.

TDWR-0392 (Rev. 1 12 79) WELL OWNER'S COPY

TEST WELL P-3
(PRODUCTION WELL)
LITHOLOGIC LOG

Depth (feet)	Description
0-5	Sandstone, light reddish-brown, fine grained to medium grained, sub-rounded moderately well sorted quartz, comprising approximately 95% of sample. Remaining 15% is very fine grained sandstone to siltstone.
5-10	Sandstone, similar to samples 0-5.
10-15	Sandstone, similar to samples 0-5.
15-20	Sandstone, similar to samples 0-5 but picking up rock fragments of various colors, most fairly well rounded.
20-25	Sandstone, reddish-brown, fine-grained to medium-grained, round to sub-rounded quartz. Percentage of rock fragments has diminished, sorting is good. Sample is nearly 100% quartz.
25-30	Sandstone, similar to 20-25. Possibly a little deeper reddish-brown color.
30-35	Sandstone, similar to 25-30. Slightly lighter in color.
35-40	Sandstone, similar to 30-35.
40-45	Sandstone, fine-grained, reddish-brown, rounded to sub-rounded, well sorted, over 95% quartz grains.
45-50	Sandstone, similar to 40-45.
50-55	Sandstone, similar to 40-45. Slight hydrocarbon scum on pit at 55 feet.
55-60	Sandstone, similar to 40-45 with increase of vary colored rock fragments.

TEST WELL P-3 (Continued)
(PRODUCTION WELL)
LITHOLOGIC LOG

Depth (feet)	Description
60-65	Sandstone, similar to 55-60.
65-70	Sandstone, similar to 55-60.
70-75	Sandstone, grayish-reddish-brown, fine-grained, sub-rounded to rounded, moderately well-sorted, an increase in vary colored rock fragments.
75-80	Sandstone, reddish-brown, light, fine-grained, rounded to sub-rounded, well sorted quartz. Rock fragments have diminished; very little silt.
80-85	Sandstone, similar to 75-80.
85-90	Sandstone, reddish-brown, very fine-grained to fine-grained, round to sub-round, moderately well sorted, quartz. Only rare rock fragments.
90-95	Siltstone and clay, red-brown.
95-100	Sandstone, conglomeratic, fine-grained to pebble size, varying colors, fragments angular to well-rounded, the larger grains being sub-rounded to angular; occasional grains rounded in the smaller grain size. All types of rock fragments represented, limestones, sandstones.
100-105	Sandstone, reddish-gray-brown, fine-grained, sub-angular with occasional sub-rounded fragments or grains. Many rock fragments seen as small rounded grains, mostly black and white.
105-107	Shale, red to slightly brownish-red, silty, clay. Top of Dockum group, red beds 105 feet.
107	TD

RECOVERY WELL CONSTRUCTION

WELL NO. RW-106

CLIENT: FINA OIL & CHEMICAL COMPANY JOB NO: 019505.2 SHEET 1 OF 1

SITE: BIG SPRING, TEXAS DATE: START: Aug 25, 1992 FINISH: Aug 26, 1992

GEOLOGIST: James D. Shotwell DRILLER: Dusty Choate DRILLING RIG TYPE: Failing 1000

DRILLING METHODS: Air Rotary TOTAL DEPTH: 85 feet HOLE DIAMETER: 12.25 inches

SITE COORDINATES: 240132.80' N + 791443.67' E ELEVATIONS: GROUND: NA PAD: 2440.58' TOC: 2442.67' PROT. CSG: 2442.45

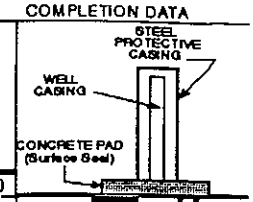
WATER LEVEL: DEPTH: 57.38 feet DATUM: TOC DATE: Aug. 26, 1992 TIME: 7:50 AM

JONES AND NEUSE, INC.
Environmental and Engineering Consultants

LITHOLOGIC DESCRIPTION

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION
0				SP		SAND uniform, fine grained, loose, red, dry.
10				SP		SAND as above.
20				SP		SAND as above.
30				SP		SAND as above.
40				SP		SAND as above.
50				SP		SAND as above.
60						Saturation @ 58 feet; Strong gasoline odor.
				SP		SAND as above, saturated, gasoline odor.
70				SP		SAND as above.
80				SP		SAND as above.
				SP		SAND as above.
90						Boring Terminated @ 85 feet below grade.
100						

COMPLETION DATA



(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MW-STAND.WK3

RECOVERY WELL CONSTRUCTION

WELL NO. RW-112

CLIENT: FINA OIL AND CHEMICAL COMPANY JOB NO: 019505.02 SHEET 1 OF 1

SITE: Big Spring, Texas – South Boundary DATE: START: 14 Sept. 93 FINISH: 14 Sept. 93

GEOLOGIST: James D. Shotwell DRILLER: Choate Well Sevices, Inc. DRILLING RIG TYPE: Failing 1500

DRILLING METHODS: Air Rotary TOTAL DEPTH: 60 feet HOLE DIAMETER: 12.25 inches

SITE COORDINATES: N237781.46 / E791370.45 ELEVATIONS: GROUND: 2385.50 PAD: 2385.54 TOC: 2387.48 PROT. CSG: N/A

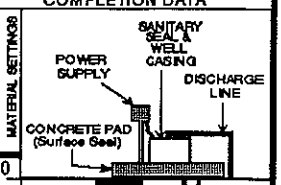
PUMP INFORMATION: TYPE: MODEL: INTAKE LEVEL: Hp GPM

JONES AND NEUSE, INC.
Environmental and Engineering Consultants

LITHOLOGIC DESCRIPTION

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	
0				SP		Sand uniform, fine–very fine grained, loose, red–tan, damp, no odor, 5–10% fines.
10				SP		Sand as above.
				SP		Gravelly Sand uniform, fine–very fine, loose, dry, with 5% Gravel, medium, loose, rounded quartz and caliche , no odor.
20						SATURATION @ 23 FEET
				SC		Clayey Sand very fine, loosely cemented, tan, no odor, 15% fines, saturated.
30				SM		Silty Sand very fine–fine, loose, red–tan, saturated, no odor, 15–20% fines.
				SP		Sand uniform, fine, loose, red–orange, saturated, slight HC odor.
40				SM		Gravelly Silty Sand fine, loose, red, saturated, slight HC odor, 15% rounded quartz
				GP		Sandy Gravel and chert Gravel, 10% Silt. medium–coarse, loose, rounded to angular, quartz, chert, and
				CH		Clay limestone, dark gray, tan and red, saturated. highly plastic, stiff, orange–red, damp.
50				CH		Clay as above.
60				CH		Clay as above.
						Boring Terminated at 60 feet below grade level.
70						
80						
90						
100						

COMPLETION DATA



(1) UNIFIED SOIL CLASSIFICATION SYSTEM

RECOVERY.WK3

MONITOR WELL CONSTRUCTION

WELL NO. DW-117

CLIENT: Fina JOB NO: 019505.5 SHEET 1 OF 2

SITE: Big Spring Refinery DATE: START: 9-23-93 FINISH: 9-23-93

GEOLOGIST: Brad Stokes DRILLER: Choate Well Services DRILLING RIG TYPE: Failing 1000

DRILLING METHODS: Air / Wet Rotary TOTAL DEPTH: 110 Feet HOLE DIAMETER: 6.75 Inch

SITE COORDINATES: ELEVATIONS: GROUND: PAD: TOC: PROT. CSG:

WATER LEVEL: DEPTH: DATUM: DATE: TIME:

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION
0				SM		SILTY SAND –very fine grained with 40% silt in matrix, poorly graded, loose, dry light tan color, no odor
10						SILTY SAND –similar to above
20						SILTY SAND –similar to above – becomes reddish tan in color below 25 feet
30						SILTY SAND –similar to above
40						SILTY SAND –similar to above
50						SILTY SAND –similar to above
60						SILTY SAND –similar to above
70						SILTY SAND –similar to above – diesel odor below 71 feet
80						SILTY SAND –similar to above – saturated below 81 feet
90						
100						

JONES AND NEUSE, INC.
Environmental and Engineering Consultants

COMPLETION DATA

(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MW-STAND.WK3

MONITOR WELL CONSTRUCTION

CLIENT: Fina | JOB NO: 019505.5 | WELL NO. DW-117
SITE: Big Spring Refinery | DATE: START: 9-23-93 | SHEET 2 OF 2 | FINISH: 9-23-93
GEOLOGIST: Brad Stokes | DRILLER: Choate Well Services | DRILLING RIG TYPE: Failing 1000
DRILLING METHODS: Air / Wet Rotary | TOTAL DEPTH: 110 Feet | HOLE DIAMETER: 6.75 Inch
SITE COORDINATES: | ELEVATIONS: GROUND: | PAD: | TOC: | PROT. CSG:
WATER LEVEL: DEPTH: | DATUM: | DATE: | TIME:

JONES AND NEUSE, INC.
Environmental and Engineering Consultants

LITHOLOGIC DESCRIPTION

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION
100				SM		SILTY SAND –similar to above
110						– red color below 109 feet, "false Red Bed"
						BORING TERMINATED BELOW 110.0 FEET BELOW GRADE

COMPLETION DATA

MATERIAL SETTINGS	BELOW GRADE MATERIAL COMPLETIONS CONTINUED FROM PREVIOUS PAGE
110	8/16 Filter Pack Sand

(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MW-PG2.WK3

MONITOR WELL CONSTRUCTION

WELL NO. IW–127

CLIENT: FINA OIL AND CHEMICAL COMPANY JOB NO: 019505.02 SHEET 1 OF 2

SITE: SOUTH BOUNDARY – PHASE III DATE: START: 30 Nov 93 FINISH: 30 Nov 93

GEOLOGIST: James D. Shotwell DRILLER: Dusty Choate DRILLING RIG TYPE: Failing 1000

DRILLING METHODS: Air Rotary TOTAL DEPTH: 120 feet HOLE DIAMETER: 6.75–inches

SITE COORDINATES: 239811.03' N and 790110.32' E ELEVATIONS: GROUND: 2451.13' PAD: 2451.63' TOC: 2454.26' PROT. CSG: 2454.66'

WATER LEVEL: DEPTH: 72.97' DATUM: TOC DATE: 2 Dec 93 TIME: 1048

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION
0				Ss		CALICHE very fine, very hard, brittle, siliceous and calcareous, tan–buff–white, dry.
				SP		SAND uniform, fine, loose to lightly cemented, red, dry.
10				SP		SAND as above.
20				SP		SAND as above.
30				SP		SAND as above.
40				SP		SAND as above.
50				SP		SAND as above, becoming damp.
60				SP		SAND as above, becoming moist.
70						SATURATION @ 71 FEET, strong hydrocarbon odor.
				SP		SAND as above, saturated.
80				SP		SAND as above, saturated, hydrocarbon odor.
				Ss		SANDSTONE very fine, hard, well cemented, tan, saturated, no odor.
90				SP		SAND uniform, fine, tan, saturated, hydrocarbon odor.
				SP		SAND as above.
100				SP		SAND as above.

(Continued on page 2)

JONES AND NEUSE, INC. Environmental and Engineering Consultants

COMPLETION DATA

MATERIAL SETTINGS

STEEL PROTECTIVE CASING

WELL CASING

CONCRETE PAD (Surface Seal)

8" PVC Cas

Cmnt Bent. Grout

2" ID Sch 40 PVC Cas

Cmnt Bent. Grout

2" ID Sch 40 PVC Cas

59'

Bent Seal

63'

Cent. > 66'

Filter Pack Sand

2" ID 0.02" Mill Slot Scrn.

(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MONITOR WELL CONSTRUCTION

WELL NO. IW-127

CLIENT: FINA OIL AND CHEMICAL COMPANY JOB NO: 019505.02 SHEET 2 OF 2

SITE: PHASE III – SOUTH BOUNDARY DATE: START: 30 Nov 93 FINISH: 30 Nov 93

GEOLOGIST: James D. Shotwell DRILLER: Dusty Choate DRILLING RIG TYPE: Failing 1000

DRILLING METHODS: Air Rotary TOTAL DEPTH: 120 feet HOLE DIAMETER: 6.75-inch

SITE COORDINATES: 239811.03' N and 790110.32' E ELEVATIONS: GROUND: 2451.13' PAD: 2451.63' TOC: 2454.26' PROT. CSG: 2454.66'

WATER LEVEL: DEPTH: 72.97' DATUM: TOC DATE: 2 Dec 93 TIME: 1048

JONES AND NEUSE, INC.
Environmental and Engineering Consultants

LITHOLOGIC DESCRIPTION

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION
100				SP	SAND	as above.
				GP	GRAVEL	fine–coarse, loose, quartz and limestone, various colors, <2% Sand.
				CH	CLAY	highly plastic, hard, orange–red, damp.
110				CH	CLAY	as above.
120				CH	CLAY	as above.
						Boring terminated at 120 feet below grade.

COMPLETION DATA

MATERIAL SETTINGS

BELOW GRADE MATERIAL COMPLETIONS CONTINUED FROM PREVIOUS PAGE

Filter Pack Sand

Sand pt set @ 106'

(1) UNIFIED SOIL CLASSIFICATION SYSTEM

MW-PG2.WK3

RECOVERY WELL CONSTRUCTION

WELL NO. RW-140

CLIENT: Fina Oil and Chemical | JOB NO: 019505.2 | SHEET ___ OF ___

SITE: Big Spring Refinery | DATE: START: 2-2-94 | FINISH: 2-2-94

GEOLOGIST: Brad Stokes | DRILLER: Choate Well Services | DRILLING RIG TYPE: Failing 1000

DRILLING METHODS: Air Rotary | TOTAL DEPTH: 60 Feet | HOLE DIAMETER: 12.25 Inch

SITE COORDINATES: N 237849.14, E 791712.21 | ELEVATIONS: GROUND: NA | PAD: 2386.02 | TOC: 2388.84 | PROT. CSG: NA

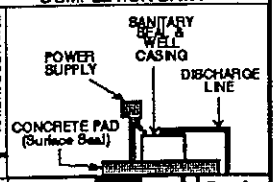
PUMP INFORMATION: TYPE : ___ | MODEL : ___ | INTAKE LEVEL : ___ | ___ Hp | ___ GPM

JONES AND NEUSE, INC.
Environmental and Engineering Consultants

LITHOLOGIC DESCRIPTION

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION
0				SM		SILTY SAND –fine grained, with 20% silt in matrix, rounded quartz grains, loose to compact, reddish brown color, no odor, dry
						–with occasional caliche gravel
10						SILTY SAND –similar to above
						–becomes damp below 17 feet
20						SILTY SAND –saturated below 18 feet, phenolic odor
30						SILTY SAND –similar to above
40				GW		SANDY GRAVEL pebble to cobble sized chert quartz and limestone gravel, with coarse to medium grained quartz sand, saturated, compact, various colors
				CH		SILTY CLAY –moderate plasticity, firm to stiff, with 15% silt in matrix, brick–red color DOCKUM FM.
50						SILTY CLAY –similar to above
60						BORING TERMINATED AT 60.0 FEET BELOW GRADE
70						
80						
90						
100						

COMPLETION DATA



MATERIAL SETTINGS	
0	
6	Cement & Bent. Grout
8	Bent.
12	
32	8/16 Filter Pack Sand
37	
42	
60	Cave –In

Steel Surface Casing

PVC Casing

6 Inch Diam. 0.020 inch Mill slot PVC Screen

PVC Casing

PVC Screen

(1) UNIFIED SOIL CLASSIFICATION SYSTEM

REC–SC.WK3

RECOVERY WELL CONSTRUCTION

WELL NO. RW-141

CLIENT: Fina Oil and Chemical Company JOB NO: 019577.1 SHEET 1 OF 1

SITE: Big Spring Refinery DATE: START: 2-17-94 FINISH: 2-17-94

GEOLOGIST: Brad Stokes DRILLER: Choate Well Services DRILLING RIG TYPE: Failing 1000

DRILLING METHODS: Air Rotary TOTAL DEPTH: 80 Feet HOLE DIAMETER: 12.25 Inch

SITE COORDINATES: N 237433.75, E 789813.28 ELEVATIONS: GROUND: NA PAD: 2402.94 TOC: 2406.25 PROT. CSG: NA

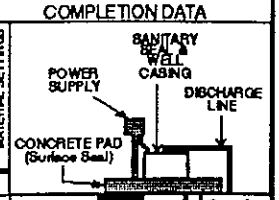
PUMP INFORMATION: TYPE : MODEL : INTAKE LEVEL : Hp GPM

JONES AND NEUSE, INC.
Environmental and Engineering Consultants

LITHOLOGIC DESCRIPTION

DEPTH (FEET)	USCS SYMBOL (1)	LITHOLOGIC DESCRIPTION
0	SM	SILTY SAND –very fine grained quartz sand, subrounded, with 20–30% silt in matrix, dry, compact, light tan color, with occasional caliche nodule.
10	SM	SILTY SAND –similar to above. –becomes reddish tan below 15 feet, with occasional sandstone seam.
20	SM	SILTY SAND –similar to above. –sandstone seam at 25 feet, caliche cement.
30	SM	SILTY SAND –similar to above.
40	SM	–saturated below 39 feet. SILTY SAND –similar to above. –sandstone seam at 45 feet.
50	SM	SILTY SAND –similar to above.
60	GW	SANDY GRAVEL well rounded chert, quartz, and limestone gravel, pebble to cobble sized, coarse to med quartz sand, compact, sat., multicolored.
	CH	SILTY CLAY –moderate plasticity, with 20–25% silt in matrix, stiff, brick-red color, DOCKUM FORMATION.
70	CH	SILTY CLAY –similar to above.
80		BORING TERMINATED AT 80.0 FEET BELOW GRADE
90		
100		

COMPLETION DATA



MATERIAL SETTINGS	
0	Steel Surface Casing
5	Cement & Bent. Grout
20	6 Inch Diam. PVC Casing
22	Bent.
31	8/16 Filter Pack Sand
	6 Inch Diam. 0.020 inch Mill slot PVC Screen
51	PVC Casing
56	PVC Screen
61	
61.5	PVC Cap
	Cave –in
80	

(1) UNIFIED SOIL CLASSIFICATION SYSTEM

REC-SC.WK3

RECOVERY WELL CONSTRUCTION

WELL NO. RW-142

CLIENT: Fina Oil and Chemical Company JOB NO: 019577.1 SHEET 1 OF 2

SITE: Big Spring Refinery DATE: START: 2-16-94 FINISH: 2-16-94

GEOLOGIST: Brad Stokes DRILLER: Choate Well Services DRILLING RIG TYPE: Failing 1000

DRILLING METHODS: Air Rotary TOTAL DEPTH: 110 Feet HOLE DIAMETER: 12.25 Inch

SITE COORDINATES: N 237654.52, E 790806.94 ELEVATIONS: GROUND: NA PAD: 2432.09 TOC: 2436.69 PROT. CSG: NA

PUMP INFORMATION: TYPE : MODEL : INTAKE LEVEL : Hp GPM

JONES AND NEUSE, INC.
Environmental and Engineering Consultants

LITHOLOGIC DESCRIPTION

DEPTH (FEET)	USCS SYMBOL (1)	LITHOLOGIC DESCRIPTION
0	SM	SILTY SAND –very fine grained quartz sand, with 20–30% silt in matrix, dry, compact to dense, brown color, no odor. –caliche from 3 to 15 feet, white, moderately cemented, hard, gradually diminishes.
10	SM	SILTY SAND –similar to above.
20	SM	SILTY SAND –similar to above, caliche from 20 to 23 feet, hard, white. –light reddish tan color below 23 feet, occasional caliche nodule.
30	SM	SILTY SAND –similar to above.
40	SM	SILTY SAND –similar to above.
50	SM	SILTY SAND –similar to above, reddish tan below 50 feet. –occasional sandstone seams.
60	SM	SILTY SAND –similar to above. –sandstone seam 62–63 feet. –sandstone seam 64–66 feet, saturated below 65 feet, phenolic odor. –calichefied sand below 67 feet.
70	SM	SILTY SAND –similar to above.
80	SM	SILTY SAND –similar to above.
	GW	SANDY GRAVEL well rounded chert, quartz, and limestone gravel, pebble to cobble sized, coarse to medium grained quartz sand, sat., multicolored.
90	CH	SILTY CLAY –moderate to high plasticity, with 10% silt in matrix, stiff, damp, brick–red color, with small inclusions of light gray clay, DOCKUM FORMATION.
100		

(continued on Sheet 2)

COMPLETION DATA

MATERIAL SETTINGS	
0	SANITARY SEAL & WELL CASING; POWER SUPPLY; DISCHARGE LINE; CONCRETE PAD (Surface Seal)
5	Steel Surface Casing
	Cement & Bent. Grout
53	
55	Bent.
60	6 Inch Diam. PVC Casing
	8/16 Filter Pack Sand
80	6 Inch Diam. 0.020 inch Mill slot PVC Screen
85	PVC Casing
90	PVC Screen
90.5	PVC Cap
	Cave–in

(1) UNIFIED SOIL CLASSIFICATION SYSTEM

REC–SC.WK3

RECOVERY WELL CONSTRUCTION

WELL NO. RW-142

CLIENT: Fina Oil and Chemical Company JOB NO: 019577.1 SHEET 2 OF 2

SITE: Big Spring Refinery DATE: START: 2-16-94 FINISH: 2-16-94

GEOLOGIST: Brad Stokes DRILLER: Choate Well Services DRILLING RIG TYPE: Failing 1000

DRILLING METHODS: Air Rotary TOTAL DEPTH: 110 Feet HOLE DIAMETER: 12.25 Inch

SITE COORDINATES: N 237654.52, E 790806.94 ELEVATIONS: GROUND: NA PAD: 2432.09 TOC: 2436.69 PROT. CSG: NA

PUMP INFORMATION: TYPE : MODEL : INTAKE LEVEL : Hp GPM

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION (JONES AND NEUSE, INC. Environmental and Engineering Consultants)	COMPLETION DATA: MATERIAL SETTINGS
100							100 CONTINUED FROM SHEET 1
				CH		SILTY CLAY –moderate to high plasticity, with 10% silt in matrix, stiff, damp, brick–red color, with small inclusions of light gray clay, DOCKUM FORMATION.	Cave–in
110							110
						BORING TERMINATED AT 110.0 FEET BELOW GRADE	
120							
130							
140							
150							
160							
170							
180							
190							
200							

(1) UNIFIED SOIL CLASSIFICATION SYSTEM

REC–SC.WK3

RECOVERY WELL CONSTRUCTION

WELL NO. RW-143

CLIENT: Fina Oil and Chemical Company JOB NO: 019577.1 SHEET 1 OF 2

SITE: Big Spring Refinery DATE: START: 2-15-94 FINISH: 2-15--94

GEOLOGIST: Brad Stokes DRILLER: Choate Well Services DRILLING RIG TYPE: Failing 1000

DRILLING METHODS: Air Rotary TOTAL DEPTH: 120 Feet HOLE DIAMETER: 12.25 Inch

SITE COORDINATES: N 238020.06, E 792459.81 ELEVATIONS: GROUND: NA PAD: 2437.00 TOC: 2441.83 PROT. CSG: NA

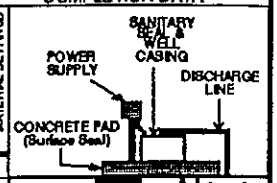
PUMP INFORMATION: TYPE : MODEL : INTAKE LEVEL : Hp GPM

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION
0				SM		SILTY SAND –Very fine grained quartz sand w/20–30% silt in matrix, dry, compact, light reddish tan color. –caliche below 3.5 feet, moderately to lightly cemented white to 1" diminishes gradually.
20				SM		SILTY SAND –hard caliche below 22' to 28'
40				SM		SILTY SAND similar to above
60				SM		SILTY SAND similar to above –sandstone seam @ 65 to 70' & 73–78 –saturated below 71, phenolic odor
80				SM		SILTY SAND similar to above
90				GW		SANDY GRAVEL pebble to cobble sized quartz, chert & limestone gravel well rounded, with medium to coarse qtz. sand, saturated.
100				CH		SILTY CLAY –mod. to high plasticity, stiff, w/10–15% silt in matrix damp, brick–red color DOCKUM FORMATION.

Continued on Page 2

JONES AND NEUSE, INC. Environmental and Engineering Consultants

COMPLETION DATA



MATERIAL SETTINGS	
0	Steel Surface Casing
5	
	Cement & Bent. Grout
54	
56	Bent.
65	8/16 Filter Sand Pack
	6 Inch Diam. 0.020 inch Mill slot PVC Screen
85	
90	PVC Casing
	PVC Screen
95.5	Cave–in

(1) UNIFIED SOIL CLASSIFICATION SYSTEM

REC–SC.WK3

RECOVERY WELL CONSTRUCTION

WELL NO. RW-143

CLIENT: Fina Oil and Chemical Company JOB NO: 019577.1 SHEET 2 OF 2

SITE: Big Spring Refinery DATE: START: 2-15-94 FINISH: 2-15-94

GEOLOGIST: Brad Stokes DRILLER: Choate Well Services DRILLING RIG TYPE: Failing 1000

DRILLING METHODS: Air Rotary TOTAL DEPTH: 120 Feet HOLE DIAMETER: 12.25 Inch

SITE COORDINATES: N 238020.06, E 792459.81 ELEVATIONS: GROUND: NA PAD: 2437.00 TOC: 2441.83 PROT. CSG: NA

PUMP INFORMATION: TYPE : MODEL : INTAKE LEVEL : Hp GPM

JONES AND NEUSE, INC.
Environmental and Engineering Consultants

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION	COMPLETION DATA: MATERIAL SETTINGS
100							100 CONTINUED FROM SHEET 1
				CH		SILTY CLAY –moderate to high plasticity, with 10% silt in matrix, stiff, damp, brick–red color, with small inclusions of light gray clay, DOCKUM FORMATION.	Cave–in
110							
120							120
						BORING TERMINATED AT 120.0 FEET BELOW GRADE	
130							
140							
150							
160							
170							
180							
190							
200							

(1) UNIFIED SOIL CLASSIFICATION SYSTEM

REC–SC.WK3

RECOVERY WELL CONSTRUCTION

WELL NO. RW-144

CLIENT: Fina Oil and Chemical Company JOB NO: 019577.1 SHEET 1 OF 2

SITE: Big Spring Refinery DATE: START: 2-14-94 FINISH: 2-15-94

GEOLOGIST: Brad Stokes DRILLER: Choate Well Services DRILLING RIG TYPE: Failing 1000

DRILLING METHODS: Air Rotary TOTAL DEPTH: 120 Feet HOLE DIAMETER: 12.25 Inch

SITE COORDINATES: N 238215.72, E 793317.59 ELEVATIONS: GROUND: NA PAD: 2438.49 TOC: 2440.68 PROT. CSG: NA

PUMP INFORMATION: TYPE : MODEL : INTAKE LEVEL : Hp GPM

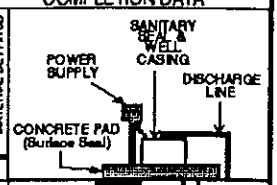
JONES AND NEUSE, INC.
Environmental and Engineering Consultants

LITHOLOGIC DESCRIPTION

DEPTH (FEET)	USCS SYMBOL (1)	STRATIGRAPHY	
0	SM	SILTY SAND	–fine to very fine grained quartz sand, with 20–30% silt in matrix, dry, compact, reddish brown color.
			–caliche from 3 to 10 feet, gradually diminishes.
10			–becomes light reddish tan below 10 feet.
	SM	SILTY SAND	–similar to above.
			–occasional thin seam of moderate to well cemented sandstone.
20	SM	SILTY SAND	–similar to above.
30	SM	SILTY SAND	–similar to above.
40	SM	SILTY SAND	–similar to above.
50			–sandstone seam 48–50 feet
	SM	SILTY SAND	–similar to above.
			–sandstone seam 53–54 feet
60			–sandstone seam at 58 feet
	SM	SILTY SAND	–similar to above.
			–becomes damp below 65 feet
			–sandstone seam 65–66 feet.
70			–sandstone seam 69–70 feet.
	SM	SILTY SAND	–similar to above, saturated below 70 feet, sandstone seam 70–72 feet.
80	GW	SANDY GRAVEL	well rounded chert, quartz, and limestone gravel, pebble to cobble sized, coarse to medium grained quartz sand, saturated, multicolored.
90			
	CH	SILTY CLAY	–moderate to high plasticity, with 10% silt in matrix, stiff, damp, brick–red color, with small inclusions of light gray clay, DOCKUM FORMATION.
100			

(continued on Sheet 2)

COMPLETION DATA



MATERIAL SETTINGS	
0	Steel Surface Casing
5	
	Cement & Bent. Grout
54	
56	Bent.
62	6 Inch Diam. PVC Casing
	8/16 Filter Pack Sand
82	6 Inch Diam. 0.020 inch Mill slot PVC Screen
87	PVC Casing
	PVC Screen
97	
97.5	PVC Cap
	Cave–in

(1) UNIFIED SOIL CLASSIFICATION SYSTEM

REC–SC.WK3

RECOVERY WELL CONSTRUCTION

WELL NO. RW-144

CLIENT: Fina Oil and Chemical Company JOB NO: 019577.1 SHEET 2 OF 2

SITE: Big Spring Refinery DATE: START: 2-14-94 FINISH: 2-15-94

GEOLOGIST: Brad Stokes DRILLER: Choate Well Services DRILLING RIG TYPE: Failing 1000

DRILLING METHODS: Air Rotary TOTAL DEPTH: 120 Feet HOLE DIAMETER: 12.25 Inch

SITE COORDINATES: N 238215.72, E 793317.59 ELEVATIONS: GROUND: NA PAD: 2438.49 TOC: 2440.68 PROT. CSG: NA

PUMP INFORMATION: TYPE : MODEL : INTAKE LEVEL : Hp GPM

JONES AND NEUSE, INC.
Environmental and Engineering Consultants

LITHOLOGIC DESCRIPTION

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION	COMPLETION DATA: MATERIAL SETTINGS
100							100 CONTINUED FROM SHEET 1
				CH		SILTY CLAY –moderate to high plasticity, with 10% silt in matrix, stiff, damp, brick-red color, with small inclusions of light gray clay, DOCKUM FORMATION.	
110				CH		SILTY CLAY –similar to above.	Cave-in
120							120
						BORING TERMINATED AT 120.0 FEET BELOW GRADE	
130							
140							
150							
160							
170							
180							
190							
200							

(1) UNIFIED SOIL CLASSIFICATION SYSTEM

REC-SC.WK3

RECOVERY WELL CONSTRUCTION

WELL NO. RW-145

CLIENT: Fina Oil and Chemical Company JOB NO: 019577.1 SHEET 1 OF 1

SITE: Big Spring Refinery DATE: START: 2-11-94 FINISH: 2-14-94

GEOLOGIST: Brad Stokes DRILLER: Choate Well Services DRILLING RIG TYPE: Failing 1000

DRILLING METHODS: Air Rotary TOTAL DEPTH: 100 Feet HOLE DIAMETER: 12.25 Inch

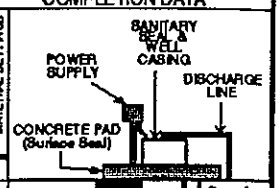
SITE COORDINATES: N 238417.18, E 794203.28 ELEVATIONS: GROUND: NA PAD: 2429.48 TOC: 2431.88 PROT. CSG: NA

PUMP INFORMATION: TYPE: MODEL: INTAKE LEVEL: Hp GPM

JONES AND NEUSE, INC.
Environmental and Engineering Consultants

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION
0				SM		SILTY SAND –fine to very fine grained quartz sand, with 15–30% silt in matrix, dry, compact, reddish brown color.
						–with occasional caliche gravel at 5 feet.
10				SM		SILTY SAND –similar to above.
						–becomes light reddish tan below 15 feet.
20				SM		SILTY SAND –similar to above.
30						–sandstone seams 28–33 feet.
				SM		SILTY SAND –similar to above.
40				SM		SILTY SAND –similar to above.
50				SM		SILTY SAND –similar to above.
						–becomes damp below 57 feet.
60						–sandstone seam at 58–60 feet.
				SM		SILTY SAND –similar to above, saturated below 60 feet..
						–sandstone seam at 63 feet.
70				SM		SILTY SAND –similar to above.
80				GW		SANDY GRAVEL well rounded chert, quartz, and limestone gravel, pebble to cobble sized, coarse to medium grained quartz sand, compact, saturated, multicolored.
				CH		SILTY CLAY –moderate plasticity, with 20–25% silt in matrix, stiff, brick–red color, DOCKUM FORMATION.
90				CH		SILTY CLAY –similar to above.
100						BORING TERMINATED AT 100.0 FEET BELOW GRADE

COMPLETION DATA



MATERIAL SETTINGS	
0	Steel Surface Casing
5	
	Cement & Bent. Grout
	6 Inch Diam. PVC Casing
43	Bent.
57	8/16 Filter Pack Sand
	6 Inch Diam. 0.020 inch Mill slot PVC Screen
77	
82	PVC Casing
87	PVC Screen
87.5	PVC Cap
	Cave –in

(1) UNIFIED SOIL CLASSIFICATION SYSTEM

REC-SC.WK3

RECOVERY WELL CONSTRUCTION

WELL NO. RW-146

CLIENT: Fina Oil and Chemical Company JOB NO: 019577.1 SHEET 1 OF 2

SITE: Big Spring Refinery DATE: START: 2-10-94 FINISH: 2-11-94

GEOLOGIST: Brad Stokes DRILLER: Choate Well Services DRILLING RIG TYPE: Failing 1000

DRILLING METHODS: Air Rotary TOTAL DEPTH: 100 Feet HOLE DIAMETER: 12.25 Inch

SITE COORDINATES: N 239130.98, E 794086.69 ELEVATIONS: GROUND: NA PAD: 2438.09 TOC: 2441.48 PROT. CSG: NA

PUMP INFORMATION: TYPE: _____ MODEL: _____ INTAKE LEVEL: _____ ___ Hp ___ GPM

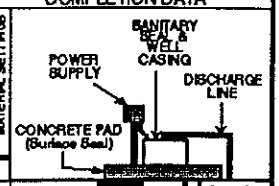
JONES AND NEUSE, INC.
Environmental and Engineering Consultants

LITHOLOGIC DESCRIPTION

DEPTH (FEET)	USCS SYMBOL (1)	LITHOLOGIC DESCRIPTION
0	SM	SILTY SAND –fine to very fine grained quartz sand, with 20% silt in matrix, dry, compact, light reddish tan color. –caliche at 4 feet, gradually diminishes at 10 feet. –occasional sandstone seams
10	SM	SILTY SAND –similar to above.
20	SM	SILTY SAND –similar to above.
30	SM	SILTY SAND –similar to above.
40	SM	SILTY SAND –similar to above.
50	SM	SILTY SAND –similar to above.
60	SM	SILTY SAND –similar to above.
70		–saturated below 68 feet.
	SM	SILTY SAND –similar to above.
80	SM	SILTY SAND –similar to above.
		–red colored sand below 85 feet, "false Red Bed", phenolic odor
90	SM	SILTY SAND –similar to above.
100	GW	SANDY GRAVEL well rounded chert, quartz, and limestone gravel, pebble to cobble sized, coarse to medium grained quartz sand, saturated, compact, multicolored.

(continued on Sheet 2)

COMPLETION DATA



MATERIAL SETTINGS	
0	Steel Surface Casing
5	
	Cement & Bent. Grout
55	Bent.
61	
66	6 Inch Diam. 0.020 inch Mill slot PVC Screen
	8/16 Filter Pack Sand
91	PVC Casing
96	PVC Screen

(1) UNIFIED SOIL CLASSIFICATION SYSTEM

REC-SC.WK3

RECOVERY WELL CONSTRUCTION

WELL NO. RW-146

CLIENT: Fina Oil and Chemical Company JOB NO: 019577.1 SHEET 2 OF 2

SITE: Big Spring Refinery DATE: START: 2-10-94 FINISH: 2-11-94

GEOLOGIST: Brad Stokes DRILLER: Choate Well Services DRILLING RIG TYPE: Failing 1000

DRILLING METHODS: Air Rotary TOTAL DEPTH: 120 Feet HOLE DIAMETER: 12.25 Inch

SITE COORDINATES: N 239130.98, E 794086.69 ELEVATIONS: GROUND: NA PAD: 2438.09 TOC: 2441.48 PROT. CSG: NA

PUMP INFORMATION: TYPE : MODEL : INTAKE LEVEL : Hp GPM

JONES AND NEUSE, INC.
Environmental and Engineering Consultants

LITHOLOGIC DESCRIPTION

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION
100				CH		SILTY CLAY –moderate plasticity, with 15–20% silt in matrix, stiff, brick red color, DOCKUM FORMATION. 101.5
110				CH		SILTY CLAY –similar to above.
120						BORING TERMINATED AT 120.0 FEET BELOW GRADE
130						
140						
150						
160						
170						
180						
190						
200						

COMPLETION DATA

MATERIAL SETTINGS	
100	CONTINUED FROM SHEET 1
101	Filter Sand / Screen / PVC Cap
	Cave-in
120	

(1) UNIFIED SOIL CLASSIFICATION SYSTEM

REC-SC.WK3

RECOVERY WELL CONSTRUCTION

WELL NO. RW-147

CLIENT: Fina Oil and Chemical Company JOB NO: 019577.1 SHEET 1 OF 2

SITE: Big Spring Refinery DATE: START: 2-9-94 FINISH: 2-10-94

GEOLOGIST: Brad Stokes DRILLER: Choate Well Services DRILLING RIG TYPE: Failing 1000

DRILLING METHODS: Air Rotary TOTAL DEPTH: 100 Feet HOLE DIAMETER: 12.25 Inch

SITE COORDINATES: N 239790.45, E 793936.21 ELEVATIONS: GROUND: NA PAD: 2445.56 TOC: 2448.40 PROT. CSG: NA

PUMP INFORMATION: TYPE: MODEL: INTAKE LEVEL: Hp GPM

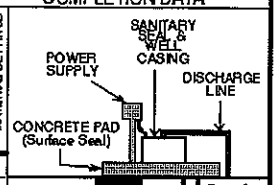
JONES AND NEUSE, INC.
Environmental and Engineering Consultants

LITHOLOGIC DESCRIPTION

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	
0				SM		SILTY SAND –very fine grained quartz sand, with 35% silt in matrix, dry, compact, light reddish tan color.
						–caliche from 4.5 to 8 feet, white, hard, gradually diminishes.
10				SM		SILTY SAND –similar to above.
						–hard caliche from 16 to 17.5 feet.
20				SM		SILTY SAND –similar to above.
30				SM		SILTY SAND –similar to above.
						–sandstone seam at 39 feet.
40				SM		SILTY SAND –similar to above.
						–thin sandstone seams throughout section.
50				SM		SILTY SAND –similar to above.
60				SM		SILTY SAND –similar to above.
70				SM		SILTY SAND –similar to above.
						–saturated below 79 feet.
80				SM		SILTY SAND –similar to above.
						–red colored sand below 85 feet, "false Red Bed", phenolic odor
90				GW		SANDY GRAVEL well rounded chert, quartz, and limestone gravel, pebble to cobble sized, coarse to medium grained quartz sand, saturated, multicolored.
100						

(continued on Sheet 2)

COMPLETION DATA



MATERIAL SETTINGS	
0	Steel Surface Casing
5	
	Cement & Bent. Grout
55	
	6 Inch Diam. PVC Casing
61	Bent.
67	
70	6 Inch Diam. 0.020 inch Mill slot PVC Screen
	8/16 Filter Pack Sand
90	PVC Casing
95	
100	PVC Screen

(1) UNIFIED SOIL CLASSIFICATION SYSTEM

REC-SC.WK3

RECOVERY WELL CONSTRUCTION

WELL NO. RW-147

CLIENT: Fina Oil and Chemical Company JOB NO: 019577.1 SHEET 2 OF 2

SITE: Big Spring Refinery DATE: START: 2-9-94 FINISH: 2-10-94

GEOLOGIST: Brad Stokes DRILLER: Choate Well Services DRILLING RIG TYPE: Failing 1000

DRILLING METHODS: Air Rotary TOTAL DEPTH: 120 Feet HOLE DIAMETER: 12.25 Inch

SITE COORDINATES: N 239790.45, E 793936.21 ELEVATIONS: GROUND: NA PAD: 2445.56 TOC: 2448.40 PROT. CSG: NA

PUMP INFORMATION: TYPE : MODEL : INTAKE LEVEL : Hp GPM

JONES AND NEUSE, INC.
Environmental and Engineering Consultants

LITHOLOGIC DESCRIPTION

DEPTH (FEET)	SAMPLE TYPE	SATURATED	ORGANIC VAPOR READING (ppm)	USCS SYMBOL (1)	STRATIGRAPHY	LITHOLOGIC DESCRIPTION
100				GW		SANDY GRAVEL well rounded chert, quartz and limestone gravel, pebble to cobble sized, coarse to med grained quartz sand, sat., multicolored (100.5)
				CH		SILTY CLAY –moderate plasticity, with 20% silt in matrix, firm to stiff, brick red color, damp, DOCKUM FORMATION.
110				CH		SILTY CLAY –similar to above.
120						BORING TERMINATED AT 120.0 FEET BELOW GRADE
130						
140						
150						
160						
170						
180						
190						
200						

COMPLETION DATA

MATERIAL SETTINGS	
100	CONTINUED FROM SHEET 1
	Sand / PVC Cap
	Cave-in
120	

(1) UNIFIED SOIL CLASSIFICATION SYSTEM

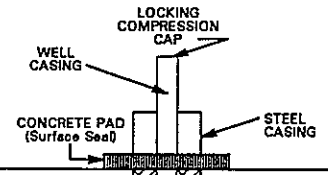
REC-SC.WK3

RMT INC.

RW-170

Client:		Start Date:	End Date:	Page of
FINA OIL AND CHEMICAL COMPANY		8-22-95	8-23-95	1 3
Site:		Drilling Method:		Project Number:
IH-20 EAST AT REFINERY ROAD, BIG SPRING, TX 79720		AIR/MUD ROTARY		50-0195.82.001
Geologist:	Driller:	Drill Rig Type:		Borehole Diameter:
COLBY DRECHSEL	C.D.S./D. CHOATE	FAILING 1000		12.25 Inches
Site Coordinates:	Total Depth:	Surface Elevation (ft.):	TOC Elevation (ft.):	PAD Elevation (ft.):
N: 238799.2000 E: 794159.8300	110.00	2433.15	2435.15	2433.15
Datum Description:	Datum Elevation:	Water Level Depth Below TOC (ft):	Date:	Time:
Texas State Plane CS, NCentral Zone				

Sample Type	Recovery (inches)	Saturation	OVM (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				1–39		SAND (SP) - 60-70% caliche nodules up to 6 cm diam., overall white to pinkish hue, moderately cemented, well sorted.
						SAND (SP) - soft, damp, well sorted, nonplastic
						white to light pink color
						SANDSTONE (Ss) - white, moderately lithified (calcareous), powdery cuttings, fine grained quartz(90%) sand, (OGALLALA FM.)
						SAND (SP) - pink, soft, moderately, calcareous cemented, (OGALLALA FM.)
						SANDSTONE (Ss) - moderately to well cemented, fine grained quartz (90%) sand, well sorted, est. 20% pore space occupied by calcareous cement, (OGALLALA FM.)



10" ID Steel surface casing to 4'

6" ID Schedule 40 PVC riser

Cement/Bentonite grout

WELL 0195 9/28/95

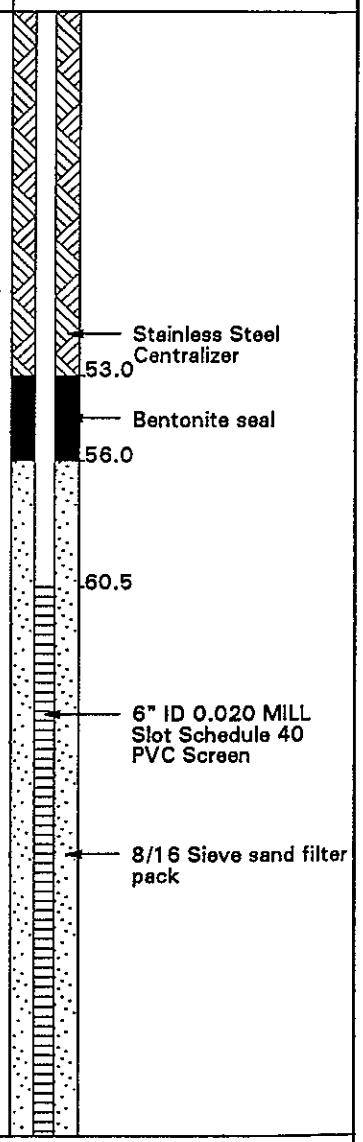
F-204A Austin (8-95)

Continued Next Page

RW-170

Client:		Start Date:	End Date:	Page of
FINA OIL AND CHEMICAL COMPANY		8-22-95	8-23-95	2 3
Site:		Drilling Method:		Project Number:
IH-20 EAST AT REFINERY ROAD, BIG SPRING, TX 79720		AIR/MUD ROTARY		50-0195.82.001
Geologist:	Driller:	Drill Rig Type:		Borehole Diameter:
COLBY DRECHSEL	C.D.S./D. CHOATE	FAILING 1000		12.25 Inches
Site Coordinates:	Total Depth:	Surface Elevation (ft.):	TOC Elevation (ft.):	PAD Elevation (ft.):
N: 238799.2000 E: 794159.8300	110.00	2433.15	2435.15	2433.15
Datum Description:	Datum Elevation:	Water Level Depth Below TOC (ft):	Date:	Time:
Texas State Plane CS, NCentral Zone				

Sample Type	Recovery (inches)	Saturation	OVM (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				41–49		white, moderately cemented
				50–54		SAND (SP) - red, soft, slight cementation, nonplastic, (OGALLALA FM.)
				55–59		SANDSTONE (Ss) - white, medium-hard sandstone, well cemented(calcareous), fine grained quartz sand, (OGALLALA FM.)
				60–65		pinkish white
	18	▽		66–69		SAND (SP) - moist, pink, low plasticity, slightly cemented, soupy texture, 10% very fine grained buff colored silt, (OGALLALA FM.)
	4			70–79		SANDSTONE (Ss) - hard, white, nonplastic, fine grained quartz sand, (OGALLALA FM.)



WELL 0195 9/28/95

F-204A Austin (8-95)

Continued Next Page

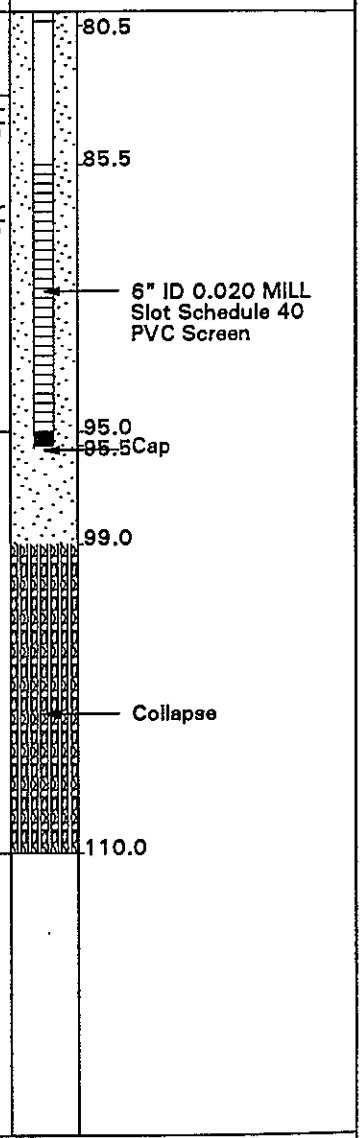
RMT INC.

RW-170

Client:		Start Date:	End Date:	Page of
FINA OIL AND CHEMICAL COMPANY		8-22-95	8-23-95	3 3
Site:		Drilling Method:		Project Number:
IH-20 EAST AT REFINERY ROAD, BIG SPRING, TX 79720		AIR/MUD ROTARY		50-0195.82.001
Geologist:	Driller:	Drill Rig Type:		Borehole Diameter:
COLBY DRECHSEL	C.D.S./D. CHOATE	FAILING 1000		12.25 Inches
Site Coordinates:	Total Depth:	Surface Elevation (ft.):	TOC Elevation (ft.):	PAD Elevation (ft.):
N: 238799.2000 E: 794159.8300	110.00	2433.15	2435.15	2433.15
Datum Description:	Datum Elevation:	Water Level Depth Below TOC (ft):	Date:	Time:
Texas State Plane CS, NCentral Zone				

Sample Type	Recovery (inches)	Saturation	OVM (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				81–84		SAND (SP) - pinkish color, (OGALLALA FM.)
				83–84		CLAY (CH) - "false" red bed, high plasticity, firm, brick red.
				84–87		GRAVEL (GW) - fine to medium pebble gravel, moderately sorted, hard, saturated; composed of sub-angular quartz, limestone, and chert, (OGALLALA FM.)
				87–88		SAND (SP) - soft, pink, medium grained, (OGALLALA FM.)
				88–95		GRAVEL (GW) - fine to medium grained pebble gravel, hard, moderately sorted, similar to above gravel lense, (OGALLALA FM.)
				90–95		SAND (SP) - soft, medium to fine quartz sand, well sorted, (OGALLALA FM.)
				95–110		CLAY (CH) - red, high plasticity, damp, (DOCKUM FM.)
				110		BOREHOLE TERMINATED 110 FEET BELOW GRADE

Two soil samples were extracted during the drilling of this well for in-situ bioremediation studies. 1.5" * 18" split-spoon tools were decontaminated using an initial steam wash and then a 91% Isopropyl alcohol flame sterilization prior to sampling.



WELL 0195 9/28/95

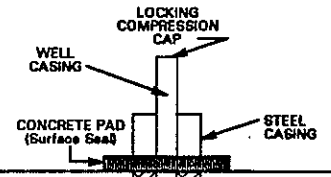
F-204A Austin (8-95)

WELL CONSTRUCTION LOG

WELL NO. RW-171

Client: FINA OIL AND CHEMICAL COMPANY		Start Date: 9-19-95	End Date: 9-20-95	Page 1 of 3
Site: Big Spring, Texas		Drilling Method: Air/Wet Rotary		Project Number: 50-00195.77
Geologist: Tracy Payne	Driller: Diversified/Powell	Drill Rig Type: Mayhew 1000		Borehole Diameter: 14 Inches
Site Coordinates: N: 240477.4400 E: 789515.3300	Total Depth: 115.00	Surface Elevation (ft.): 2459.49	TOC Elevation (ft.): 2460.79	PAD Elevation (ft.): 2459.74
Datum Description: GRADE LEVEL	Datum Elevation:	Water Level Depth Below TOC (ft):	Date:	Time:

Sample Type	Recovery (feet)	Saturation	Field Test S.C. (mS)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
X				1–9		Silty Sand (SM) - very fine grained, 40 % silt, poorly graded, loose, dry, tan, no odor.
X				10–19		Silty Sand (SM) - similar to above.
X				20–29		Silty Sand (SM) - similar to above, becomes reddish tan @ 25'.
X				30–39		Silty Sand (SM) - similar to above.
X				40–49		Silty Sand (SM) - similar to above.



16" ID Steel surface casing to 5' BGL

Cement/Bentonite Grout

8"ID Schedule 40 PVC riser

WELL 19577 12/12/95

F-204A Austin (8-95)

Continued Next Page

WELL CONSTRUCTION LOG

WELL NO. RW-171

Client: FINA OIL AND CHEMICAL COMPANY		Start Date: 9-19-95	End Date: 9-20-95	Page 2 of 3
Site: Big Spring, Texas		Drilling Method: Air/Wet Rotary		Project Number: 50-00195.77
Geologist: Tracy Payne	Driller: Diversified/Powell	Drill Rig Type: Mayhew 1000		Borehole Diameter: 14 Inches
Site Coordinates: N: 240477.4400 E: 789515.3300	Total Depth: 115.00	Surface Elevation (ft.): 2459.49	TOC Elevation (ft.): 2460.79	PAD Elevation (ft.): 2459.74
Datum Description: GRADE LEVEL	Datum Elevation:	Water Level Depth Below TOC (ft):	Date:	Time:

Sample Type	Recovery (feet)	Saturation	Field Test S.C. (mS)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				51–99		Silty Sand (SM) - very fine grained, 40% silt, poorly graded, loose, dry, reddish tan at 25 feet.
						Silty Sand (SM) - similar to above.
						Silty Sand (SM) - similar to above with hydrocarbon odor @ 70', satuation @ 78', soil discolored above saturation.
						Silty Sand (SM) - similar to above, saturated. with FREE-PHASE HYDROCARBON NOTED IN RETURN PIT.
						Silty Sand (SM) - similar to above.

60.5 Stainless steel centralizer

Bentonite seal

68.0

73.0

8" ID 0.020 MILL Slot Schedule 40 PVC Screen

8/16 Sieve sand filter pack

WELL 19577 12/12/95

F-204A Austin (8-95)

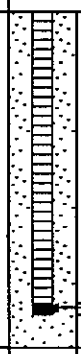
Continued Next Page

WELL CONSTRUCTION LOG

WELL NO. RW-171

Client: FINA OIL AND CHEMICAL COMPANY		Start Date: 9-19-95	End Date: 9-20-95	Page 3 of 3
Site: Big Spring, Texas		Drilling Method: Air/Wet Rotary		Project Number: 50-00195.77
Geologist: Tracy Payne	Driller: Diversified/Powell	Drill Rig Type: Mayhew 1000		Borehole Diameter: 14 Inches
Site Coordinates: N: 240477.4400 E: 789515.3300	Total Depth: 115.00	Surface Elevation (ft.): 2459.49	TOC Elevation (ft.): 2460.79	PAD Elevation (ft.): 2459.74
Datum Description: GRADE LEVEL	Datum Elevation:	Water Level Depth Below TOC (ft):	Date:	Time:

Sample Type	Recovery (feet)	Saturation	Field Test S.C. (mS)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
X				101–110		Silty Sand (SM) - 40% silt, poorly graded, loose, dry, reddish tan, coarse grained.
X				110–115		Sand (SP) - subangular, coarse, loose, saturated, moderately graded, grading to pebble-sized gravel.
				115–149		Clay Red Bed Dockum FM T.D. @ 115 feet



WELL 19577 12/12/95

F-204A Austin (8-95)

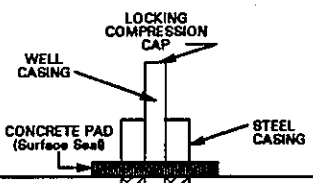
WELL CONSTRUCTION LOG

WELL NO. W-172

Client:		Start Date:	End Date:	Page of
FINA OIL AND CHEMICAL COMPANY		9-21-95	9-21-95	1 3
Site:		**Drilling Method:**		**Project Number:**
Big Spring, Texas		Air/Wet Rotary		50-00195.77
Geologist:	**Driller:**	**Drill Rig Type:**		**Borehole Diameter:**
Tracy Payne	Diversified/Powell	Mayhew 1000		14 Inches
Site Coordinates:	**Total Depth:**	**Surface Elevation (ft.):**	**TOC Elevation (ft.):**	**PAD Elevation (ft.):**
N: 240513.2200 E: 789959.1100	117.00	2460.05	2461.24	2460.30
Datum Description:	**Datum Elevation:**	**Water Level Depth Below TOC (ft):**	**Date:**	**Time:**
GRADE LEVEL				

Sample Type | Recovery (feet) | Saturation | Field Test S.C. (mS) | Depth (feet) | Stratigraphy

LITHOLOGIC DESCRIPTION



Silty Sand (SM) - very fine grained, 40% silt, poorly graded, loose, dry, reddish brown, no odor.

Silty Sand (SM) - very fine grained, 20 % silt, poorly graded, loose, dry, light tan, no odor, occasional seams of poor-moderately cemented grains.

Silty Sand (SM) - Similar to above.

Sand (SW) - fine-medium grained, well graded, loose, dry, tan, no odor.

Sand (SW) - similar to above.

Sand (SW) - similar to above except 20% silt @ 45' BGL.

16" ID Steel surface casing to 5' BGL

Cement/Bentonite Grout

8"ID Schedule 40 PVC riser

WELL 19677 12/12/95

F-204A Austin (8-95)

Continued Next Page

WELL CONSTRUCTION LOG

WELL NO. W-172

Client: FINA OIL AND CHEMICAL COMPANY	Start Date: 9-21-95	End Date: 9-21-95	Page 2 of 3
Site: Big Spring, Texas	Drilling Method: Air/Wet Rotary		Project Number: 50-00195.77
Geologist: Tracy Payne	Driller: Diversified/Powell	Drill Rig Type: Mayhew 1000	Borehole Diameter: 14 Inches
Site Coordinates: N: 240513.2200 E: 789959.1100	Total Depth: 117.00	Surface Elevation (ft.): 2460.05	TOC Elevation (ft.): 2461.24 / PAD Elevation (ft.): 2460.30
Datum Description: GRADE LEVEL	Datum Elevation:	Water Level Depth Below TOC (ft):	Date: / Time:

Sample Type	Recovery (feet)	Saturation	Field Test S.C. (mS)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				51–59		Silty Sand (SM) - very fine grained, 40% silt, poorly graded, loose, dry, tan, no odor.
				60–69		Silty Sand (SM) - similar to above, odor @ 65' BGL
				70–79		Silty Sand (SM) - similar to above, odor stronger, soil discolored @ 75'BGL saturation @ 78'BGL.
				80–89		Silty Sand (SM) - similar to above, FREE-PHASE HYDROCARBON IN RETURN PIT.
				90–99		Silty Sand (SM) - similar to above.

64.0 Stainless steel centralizer
Bentonite seal
68.0
73.0
8" ID 0.020 MILL Slot Schedule 40 PVC Screen
8/16 Sieve sand filter pack

WELL 19677 12/12/95

F-204A Austin (8-95)

Continued Next Page

WELL CONSTRUCTION LOG

WELL NO. W-172

Client: FINA OIL AND CHEMICAL COMPANY	Start Date: 9-21-95	End Date: 9-21-95	Page 3 of 3
Site: Big Spring, Texas	Drilling Method: Air/Wet Rotary		Project Number: 50-00195.77
Geologist: Tracy Payne	Driller: Diversified/Powell	Drill Rig Type: Mayhew 1000	Borehole Diameter: 14 Inches
Site Coordinates: N: 240513.2200 E: 789959.1100	Total Depth: 117.00	Surface Elevation (ft.): 2460.05	TOC Elevation (ft.): 2461.24 / PAD Elevation (ft.): 2460.30
Datum Description: GRADE LEVEL	Datum Elevation:	Water Level Depth Below TOC (ft):	Date: / Time:

Sample Type	Recovery (feet)	Saturation	Field Test S.C. (mS)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				101–117		Gravelly Sand (SW) - subangular, fine-medium grained, loose, reddish brown, pebble sized gravel 10%, increasing gravel @ 108-110' 30-40%.
				112–117		Sandy Gravel (GM) - pebble sized gravel with subangular, fine-medium grained sand 40% sand.
				117–149		Red Bed @ 117' BGL, Dockum FM. T.D. @ 117 feet

108.0
108.5 End Cap
117.0

WELL 19577 12/12/95

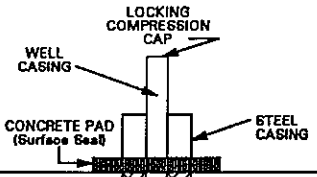
F-204A Austin (8-95)

WELL CONSTRUCTION LOG

WELL NO. RW-173

Client: FINA OIL AND CHEMICAL COMPANY		Start Date: 9-5-95	End Date: 9-5-95	Page 1 of 3
Site: Big Spring, Texas		Drilling Method: Air/Wet Rotary		Project Number: 50-00195.77
Geologist: Tracy Payne	Driller: Diversified/Poewll	Drill Rig Type: Mayhew 1000		Borehole Diameter: 14 Inches
Site Coordinates: N: 240644.8300 E: 791178.8200	Total Depth: 120.00	Surface Elevation (ft.): 2455.27	TOC Elevation (ft.): 2456.26	PAD Elevation (ft.): 2455.52
Datum Description: GRADE LEVEL	Datum Elevation:	Water Level Depth Below TOC (ft):	Date:	Time:

Sample Type	Recovery (feet)	Saturation	OVM (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
X				1–9		Silty Sand (SM) - very fine grained @ 30% silt, poorly graded, loose, dry, reddish brown, no odor.
X				10–19		Silty Sand (SM) - similar to above except 40% silt & reddish tan, no odor.
X				20–29		Silty Sand (SM) - similar to above.
X				30–39		Silty Sand (SM) - similar to above.
X				40–49		Silty Sand (SM) - similar to above.



10" ID Steel surface casing to 5'

Cement/Bentonite Grout

8"ID Schedule 40 PVC riser

48.0 Bentonite seal

WELL 19577 1/9/96

F-204A Austin (8-95)

Continued Next Page

WELL CONSTRUCTION LOG

WELL NO. RW-173

Client:		Start Date:	End Date:	Page of
FINA OIL AND CHEMICAL COMPANY		9-5-95	9-5-95	2 3
Site:		Drilling Method:		Project Number:
Big Spring, Texas		Air/Wet Rotary		50-00195.77
Geologist:	Driller:	Drill Rig Type:		Borehole Diameter:
Tracy Payne	Diversified/Poewll	Mayhew 1000		14 Inches
Site Coordinates:	Total Depth:	Surface Elevation (ft.):	TOC Elevation (ft.):	PAD Elevation (ft.):
N: 240644.8300 E: 791178.8200	120.00	2455.27	2456.26	2455.52
Datum Description:	Datum Elevation:	Water Level Depth Below TOC (ft):	Date:	Time:
GRADE LEVEL				

Sample Type	Recovery (feet)	Saturation	OVM (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				51–59		Silty Sand (SM) - similar to above except odor @ 59' BGL, discolored.
				60–69		Silty Sand (SM) - similar to above, odor, sandstone @ 68' BGL Sat. @ 70'.
		▽		70–79		Silty Sand (SM) - similar to above, odor.
				80–89		Silty Sand (SM) - similar to above.
				90–99		Silty Sand (SM) - similar to above with ss seams.

51.0 Stainless steel centralizer

62.0

8" ID 0.020 MILL Slot Schedule 40 PVC Screen

8/16 Sieve sand filter pack

WELL 19577 1/9/98

F-204A Austin (8-95)

Continued Next Page

WELL CONSTRUCTION LOG

WELL NO. RW-173

Client: FINA OIL AND CHEMICAL COMPANY	Start Date: 9-5-95	End Date: 9-5-95	Page 3 of 3
Site: Big Spring, Texas	Drilling Method: Air/Wet Rotary		Project Number: 50-00195.77
Geologist: Tracy Payne	Driller: Diversified/Poewll	Drill Rig Type: Mayhew 1000	Borehole Diameter: 14 Inches
Site Coordinates: N: 240644.8300 E: 791178.8200	Total Depth: 120.00	Surface Elevation (ft.): 2455.27	TOC Elevation (ft.): 2456.26 / PAD Elevation (ft.): 2455.52
Datum Description: GRADE LEVEL	Datum Elevation:	Water Level Depth Below TOC (ft):	Date: / Time:

Sample Type	Recovery (feet)	Saturation	OVM (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				101–109		Silty Sand (SM) - similar to above.
				110–112		Geavel (GM) - pebble size with medium to coarse sand, mod. graded, reddish brown.
				113–115		Clay (CH) - false red bed.
				116–120		Gravel (GW) - med. to coarse gravel, rounded quartz and chert gravel, mod. graded.
				120–149		T.D.@ 120'

102.0
102.5 End Cap
120.0

WELL 19577 1/9/96

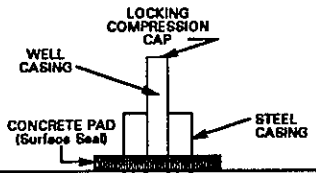
F-204A Austin (8-95)

WELL CONSTRUCTION LOG

WELL NO. RW-174

Client: FINA OIL AND CHEMICAL COMPANY	Start Date: 9-26-95	End Date: 9-26-95	Page 1 of 3
Site: Big Spring, Texas	Drilling Method: Air/Wet Rotary		Project Number: 50-00195.77
Geologist: Tracy Payne	Driller: Diversified/Powell	Drill Rig Type: Mayhew 1000	Borehole Diameter: 14 Inches
Site Coordinates: N: 240619.4200 E: 791499.7800	Total Depth: 100.00	Surface Elevation (ft.): 2453.46	TOC Elevation (ft.): 2454.49 / PAD Elevation (ft.): 2453.71
Datum Description: GRADE LEVEL	Datum Elevation:	Water Level Depth Below TOC (ft):	Date: / Time:

Sample Type	Recovery (feet)	Saturation	Field Test S.C. (mS)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
X				1–4		Clayey Sand (SC) - very fine to fine grained with 5-10% clay, dry, reddish brown, compact, no odor.
X				5–9		Silty Sand (SM) - very fine grained with 40% silt, poorly graded, loose, dry, light reddish tan, no odor.
X				10–19		Silty Sand (SM) - similar to above.
X				20–29		Silty Sand (SM) - similar to above.
X				30–39		Silty Sand (SM) - similar to above.
X				40–49		Silty Sand (SM) - similar to above.



16" ID Steel surface casing to 5'

Cement/Bentonite Grout

8"ID Schedule 40 PVC riser

WELL 19677 12/12/95

F-204A Austin (8-95)

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WELL CONSTRUCTION LOG

WELL NO. RW-174

Client:		Start Date:	End Date:	Page of
FINA OIL AND CHEMICAL COMPANY		9-26-95	9-26-95	2 3
Site:		**Drilling Method:**		**Project Number:**
Big Spring, Texas		Air/Wet Rotary		50-00195.77
Geologist:	**Driller:**	**Drill Rig Type:**		**Borehole Diameter:**
Tracy Payne	Diversified/Powell	Mayhew 1000		14 Inches
Site Coordinates:	**Total Depth:**	**Surface Elevation (ft.):**	**TOC Elevation (ft.):**	**PAD Elevation (ft.):**
N: 240619.4200 E: 791499.7800	100.00	2453.46	2454.49	2453.71
Datum Description:	**Datum Elevation:**	**Water Level Depth Below TOC (ft):**	**Date:**	**Time:**
GRADE LEVEL				

Sample Type	Recovery (feet)	Saturation	Field Test S.C. (mS)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				51–59		Silty Sand (SM) - very fine grained, with 40% silt, poorly graded, loose, dry, light reddish tan, slight odor @ 50' BGL.
				60–69		Silty Sand (SM) - similar to above, strong odor @ 65' BGL, moist, occasional sand stone seams.
		▽		70–79		Silty Sand (SM) - similar to above, except saturation @ 75' BGL.
				80–89		Silty Sand (SM) - similar to above, sand stone seams @ 85-87', 88'. FREE-PHASE HYDROCARBON IN RETURN PIT.
				90–95		Silty Sand (SM) - similar to above, sand stone seams @ 91'.
				96–99		Clay (CH) - Dockum FM

61.0 Stainless steel centralizer
Bentonite seal
65.0
70.0
8" ID 0.020 MILL Slot Schedule 40 PVC Screen
8/16 Sieve sand filter pack
95.0
95.5 End Cap
100.0

WELL 19577 12/12/95

F-204A Austin (8-95)

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WELL CONSTRUCTION LOG

WELL NO. RW-174

Client: FINA OIL AND CHEMICAL COMPANY		Start Date: 9-26-95	End Date: 9-26-95	Page 3 of 3
Site: Big Spring, Texas		Drilling Method: Air/Wet Rotary		Project Number: 50-00195.77
Geologist: Tracy Payne	Driller: Diversified/Powell	Drill Rig Type: Mayhew 1000		Borehole Diameter: 14 Inches
Site Coordinates: N: 240619.4200 E: 791499.7800	Total Depth: 100.00	Surface Elevation (ft.): 2453.46	TOC Elevation (ft.): 2454.49	PAD Elevation (ft.): 2453.71
Datum Description: GRADE LEVEL	Datum Elevation:	Water Level Depth Below TOC (ft):	Date:	Time:

Sample Type	Recovery (feet)	Saturation	Field Test S.C. (mS)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				101		T.D. @ 100'
				102		
				103		
				104		
				105		
				106		
				107		
				108		
				109		
				110		
				111		
				112		
				113		
				114		
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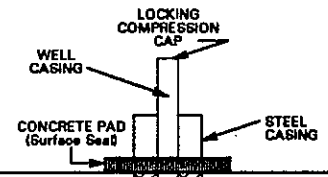
				118		
				119		
				120		
				121		
				122		
				123		
				124		
				125		
				126		
				127		
				128		
				129		
				130		
				131		
				132		
				133		
				134		
				135		
				136		
				137		
				138		
				139		
				140		
				141		
				142		
				143		
				144		
				145		
				146		
				147		
				148		
				149		

WELL CONSTRUCTION LOG

WELL NO. RW-175

Client: FINA OIL AND CHEMICAL COMPANY	Start Date: 9-27-95	End Date: 9-27-95	Page 1 of 3
Site: Big Spring, Texas	Drilling Method: Air/Wet Rotary		Project Number: 50-00195.77
Geologist: Tracy Payne / Driller: Diversified/Powell	Drill Rig Type: Mayhew 1000		Borehole Diameter: 14 Inches
Site Coordinates: N: 240652.3400 E: 791917.1300 / Total Depth: 100.00	Surface Elevation (ft.): 2433.78	TOC Elevation (ft.): 2434.90	PAD Elevation (ft.): 2434.03
Datum Description: GRADE LEVEL / Datum Elevation:	Water Level Depth Below TOC (ft):	Date:	Time:

Sample Type	Recovery (feet)	Saturation	Field Test S.C. (mS)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
X				1–9		Silty Sand (SM) - very fine grained with 40% silt, poorly graded, loose, dry, light reddish tan, no odor.
X				10–19		Silty Sand (SM) - similar to above.
X				20–29		Silty Sand (SM) - similar to above except 25-30% silt.
X				30–39		Silty Sand (SM) - similar to above, slight odor @ 35' BGL, strong odor @ 40' BGL.
X				40–49		Silty Sand (SM) - similar to above.



16" ID Steel surface casing to 5'

Cement/Bentonite Grout

8"ID Schedule 40 PVC riser

39.0 Stainless steel centralizer

Bentonite seal 43.0

48.0

WELL 19677 12/12/95

F-204A Austin (8-95)

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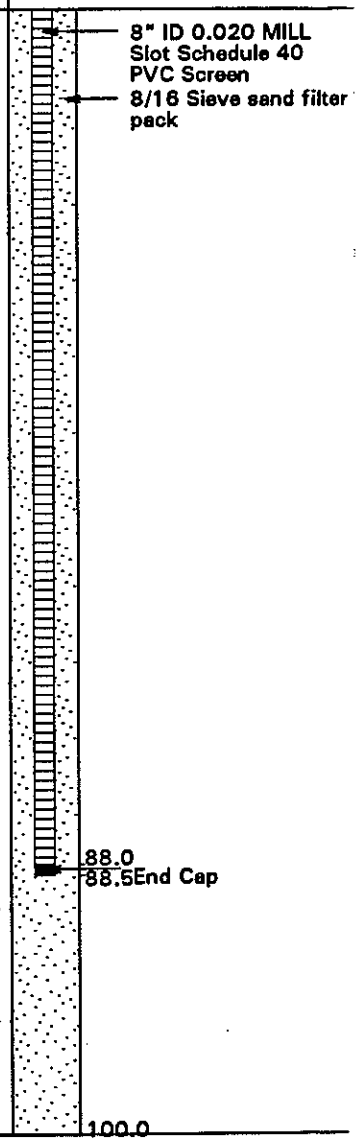
WELL CONSTRUCTION LOG

WELL NO. RW-175

Client: FINA OIL AND CHEMICAL COMPANY	Start Date: 9-27-95	End Date: 9-27-95	Page 2 of 3
Site: Big Spring, Texas	Drilling Method: Air/Wet Rotary		Project Number: 50-00195.77
Geologist: Tracy Payne	Driller: Diversified/Powell	Drill Rig Type: Mayhew 1000	Borehole Diameter: 14 Inches
Site Coordinates: N: 240652.3400 E: 791917.1300	Total Depth: 100.00	Surface Elevation (ft.): 2433.78	TOC Elevation (ft.): 2434.90 / PAD Elevation (ft.): 2434.03
Datum Description: GRADE LEVEL	Datum Elevation:	Water Level Depth Below TOC (ft):	Date: / Time:

Sample Type	Recovery (feet)	Saturation	Field Test S.C. (mS)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
		▽		51–59		Silty Sand (SM) - very fine grained, with 25-30% silt, poorly graded, loose, light reddish tan, moist @ 50' saturated @ 53' with strong odor.
				60–69		Silty Sand (SM) - similar to above.
				70–79		Silty Sand (SM) - similar to above, reddish brown, sand stone seams @ 71-73' BGL, FREE-PHASE HYDROCARBON IN RETURN PIT.
				80–89		Silty Sand (SM) - similar to above, sand stone seam @ 85-87' BGL.
				90–94		Silty Sand (SM) - similar to above with sand stone seam @ 91'.
				95–99		Clay (CH) - Dockum FM



WELL 19577 12/12/95

F-204A Austin (8-95)

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WELL CONSTRUCTION LOG

WELL NO. RW-175

Client: FINA OIL AND CHEMICAL COMPANY	Start Date: 9-27-95	End Date: 9-27-95	Page 3 of 3
Site: Big Spring, Texas	Drilling Method: Air/Wet Rotary		Project Number: 50-00195.77
Geologist: Tracy Payne / Driller: Diversified/Powell	Drill Rig Type: Mayhew 1000		Borehole Diameter: 14 Inches
Site Coordinates: N: 240652.3400 E: 791917.1300 / Total Depth: 100.00	Surface Elevation (ft.): 2433.78	TOC Elevation (ft.): 2434.90	PAD Elevation (ft.): 2434.03
Datum Description: GRADE LEVEL / Datum Elevation:	Water Level Depth Below TOC (ft):	Date:	Time:

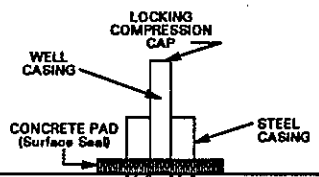
Sample Type	Recovery (feet)	Saturation	Field Test S.C. (mS)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				101–149		T.D. @ 100'

WELL CONSTRUCTION LOG

WELL NO. RW-176

Client:		Start Date:	End Date:	Page of
FINA OIL AND CHEMICAL COMPANY		9-28-95	9-28-95	1 3
Site:		**Drilling Method:**		**Project Number:**
Big Spring, Texas		Air/Wet Rotary		50-00195.77
Geologist:	**Driller:**	**Drill Rig Type:**		**Borehole Diameter:**
Tracy Payne	Diversified/Powell	Mayhew 1000		14 Inches
Site Coordinates:	**Total Depth:**	**Surface Elevation (ft.):**	**TOC Elevation (ft.):**	**PAD Elevation (ft.):**
N: 240596.0200 E: 790719.9000	103.00	2444.31	2445.46	2444.56
Datum Description:	**Datum Elevation:**	**Water Level Depth Below TOC (ft):**	**Date:**	**Time:**
GRADE LEVEL				

Sample Type	Recovery (feet)	Saturation	Field Test S.C. (mS)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
X				1–9		Silty Sand (SM) - very fine grained with 30% silt, poorly graded, loose, dry, light reddish tan, no odor.
X				10–19		Silty Sand (SM) - similar to above, damp.
X				20–29		Silty Sand (SM) - similar to above except fine grained, 20% silt, damp.
X				30–39		Silty Sand (SM) - similar to above, dry.
X				40–49		Silty Sand (SM) - similar to above.



16" ID Steel surface casing to 5'

Cement/Bentonite Grout

8"ID Schedule 40 PVC riser

49.0 Stainless steel

WELL 19577 12/12/96

F-204A Austin (8-95)

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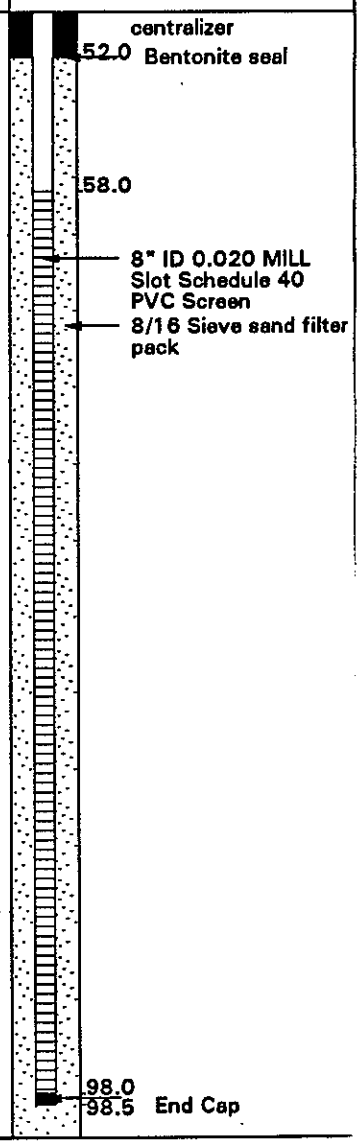
WELL CONSTRUCTION LOG

WELL NO. RW-176

Client:		Start Date:	End Date:	Page of
FINA OIL AND CHEMICAL COMPANY		9-28-95	9-28-95	2 3
Site:		**Drilling Method:**		**Project Number:**
Big Spring, Texas		Air/Wet Rotary		50-00195.77
Geologist:	**Driller:**	**Drill Rig Type:**		**Borehole Diameter:**
Tracy Payne	Diversified/Powell	Mayhew 1000		14 Inches
Site Coordinates:	**Total Depth:**	**Surface Elevation (ft.):**	**TOC Elevation (ft.):**	**PAD Elevation (ft.):**
N: 240596.0200 E: 790719.9000	103.00	2444.31	2445.46	2444.56
Datum Description:	**Datum Elevation:**	**Water Level Depth Below TOC (ft):**	**Date:**	**Time:**
GRADE LEVEL				

Sample Type	Recovery (feet)	Saturation	Field Test S.C. (mS)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
X				51–59		Silty Sand (SM) - fine grained, 20% silt, poorly graded, loose, dry, light reddish tan, slight odor.
X		▽		60–69		Silty Sand (SM) - similar to above, strong odor @ 60', saturation @ 63' BGL, reddish brown.
X				70–79		Silty Sand (SM) - similar to above sand stone seams @ 76' to 79'. Small amount of emulsion noted in return pit- no free phase.
X				80–89		Silty Sand (SM) - similar to above, sand stone seam @ 86' BGL, 1 foot thick.
X				90–99		Silty Sand (SM) - similar to above.



WELL 19577 12/12/95

F-204A Austin (8-95)

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WELL CONSTRUCTION LOG

WELL NO. RW-176

Client: FINA OIL AND CHEMICAL COMPANY		Start Date: 9-28-95	End Date: 9-28-95	Page 3 of 3
Site: Big Spring, Texas		Drilling Method: Air/Wet Rotary		Project Number: 50-00195.77
Geologist: Tracy Payne	Driller: Diversified/Powell	Drill Rig Type: Mayhew 1000		Borehole Diameter: 14 Inches
Site Coordinates: N: 240596.0200 E: 790719.9000	Total Depth: 103.00	Surface Elevation (ft.): 2444.31	TOC Elevation (ft.): 2445.46	PAD Elevation (ft.): 2444.56
Datum Description: GRADE LEVEL	Datum Elevation:	Water Level Depth Below TOC (ft):	Date:	Time:

Sample Type	Recovery (feet)	Saturation	Field Test S.C. (mS)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				101 102 103		
				104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149		T.D. @ 103'

103.0

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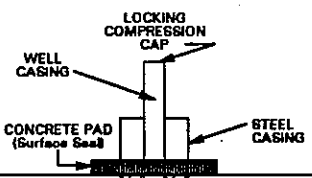
F-204A Austin (8-95)

WELL CONSTRUCTION LOG

WELL NO. RW-177

Client: FINA OIL AND CHEMICAL COMPANY	Start Date: 9-29-95	End Date: 9-29-95	Page 1 of 2
Site: Big Spring, Texas	Drilling Method: Air/Wet Rotary		Project Number: 50-00195.77
Geologist: Tracy Payne / Driller: Diversified/Powell	Drill Rig Type: Mayhew 1000		Borehole Diameter: 14 Inches
Site Coordinates: N: 239920.3800 E: 791428.4000 / Total Depth: 80.00	Surface Elevation (ft.): 2433.10	TOC Elevation (ft.): 2434.41	PAD Elevation (ft.): 2433.35
Datum Description: GRADE LEVEL / Datum Elevation:	Water Level Depth Below TOC (ft):	Date:	Time:

Sample Type	Recovery (feet)	Saturation	Field Test S.C. (mS)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
X				1–9		Silty Sand (SM) - very fine grained, poorly graded, 30- 40% silt, reddish tan, dry, no odor.
X				10–19		Silty Sand (SM) - similar to above.
X				20–29		Silty Sand (SM) - similar to above, increase of reddish tint.
X				30–39		Silty Sand (SM) - similar to above.
X				40–49		Silty Sand (SM) - similar to above, slight odor @ 47' BGL, discolored.



16" ID Steel surface casing to 5'

Cement/Bentonite Grout

8"ID Schedule 40 PVC riser

39.0 Stainless steel centralizer

Bentonite seal

43.0

48.0

WELL 19577 12/12/95

F-204A Austin (8-95)

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WELL CONSTRUCTION LOG

WELL NO. RW-177

Client: FINA OIL AND CHEMICAL COMPANY	Start Date: 9-29-95	End Date: 9-29-95	Page 2 of 2
Site: Big Spring, Texas	Drilling Method: Air/Wet Rotary		Project Number: 50-00195.77
Geologist: Tracy Payne	Driller: Diversified/Powell	Drill Rig Type: Mayhew 1000	Borehole Diameter: 14 Inches
Site Coordinates: N: 239920.3800 E: 791428.4000	Total Depth: 80.00	Surface Elevation (ft.): 2433.10	TOC Elevation (ft.): 2434.41 / PAD Elevation (ft.): 2433.35
Datum Description: GRADE LEVEL	Datum Elevation:	Water Level Depth Below TOC (ft):	Date: / Time:

Sample Type	Recovery (feet)	Saturation	Field Test S.C. (mS)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
		▽		51–59		Silty Sand (SM) - very fine grained, poorly graded, 30-40% silt, reddish tan, strong odor @ 52' saturation @ 53'.
				60–69		Silty Sand (SM) - similar to above, sandstone seams @ 65-67', 69-70', strong odor.
				70–79		Silty Sand (SM) - similar to above, occasional sandstone seams.
				80		Clay (CH) - false red bed.
				80–99		T.D. @ 80'

8" ID 0.020 MILL Slot Schedule 40 PVC Screen

8/16 Sieve sand filter pack

78.0

78.5 End Cap

80.0

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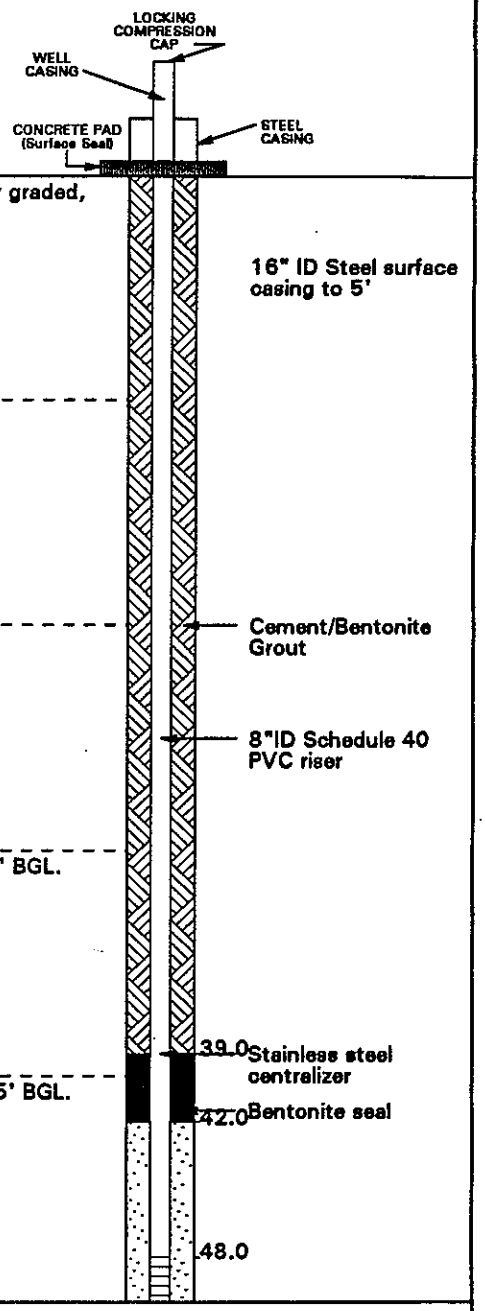
F-204A Austin (8-95)

WELL CONSTRUCTION LOG

WELL NO. RW-178

Client:		Start Date:	End Date:	Page of
FINA OIL AND CHEMICAL COMPANY		9-30-95	9-30-95	1 2
Site:		**Drilling Method:**		**Project Number:**
Big Spring, Texas		Air/ Wet Rotary		50-00195.77
Geologist:	**Driller:**	**Drill Rig Type:**		**Borehole Diameter:**
Tracy Payne	Diversified/Powell	Mayhew 1000		14 Inches
Site Coordinates:	**Total Depth:**	**Surface Elevation (ft.):**	**TOC Elevation (ft.):**	**PAD Elevation (ft.):**
N:- 240538.6800 E: 790328.5300	95.00	2436.18	2437.65	2436.43
Datum Description:	**Datum Elevation:**	**Water Level Depth Below TOC (ft):**	**Date:**	**Time:**
GRADE LEVEL				

Sample Type	Recovery (feet)	Saturation	Field Test S.C. (mS)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
X				1–9		Silty Sand (SM) - very fine grained, 40% silt, poorly graded, loose, dry, reddish brown, no odor.
X				10–19		Silty Sand (SM) - similar to above, reddish tan.
X				20–29		Silty Sand (SM) - similar to above.
X				30–39		Silty Sand (SM) - similar to above, slight odor @ 40' BGL.
X				40–49		Silty Sand (SM) - similar to above, strong odor @ 45' BGL.



WELL 19677 12/12/95

F-204A Austin (8-95)

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WELL CONSTRUCTION LOG

WELL NO. RW-178

Client: FINA OIL AND CHEMICAL COMPANY	Start Date: 9-30-95	End Date: 9-30-95	Page 2 of 2
Site: Big Spring, Texas	Drilling Method: Air/ Wet Rotary		Project Number: 50-00195.77
Geologist: Tracy Payne	Driller: Diversified/Powell	Drill Rig Type: Mayhew 1000	Borehole Diameter: 14 Inches
Site Coordinates: N: 240538.6800 E: 790328.5300	Total Depth: 95.00	Surface Elevation (ft.): 2436.18	TOC Elevation (ft.): 2437.65 / PAD Elevation (ft.): 2436.43
Datum Description: GRADE LEVEL	Datum Elevation:	Water Level Depth Below TOC (ft):	Date: / Time:

Sample Type	Recovery (feet)	Saturation	Field Test S.C. (mS)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
		▽		51–59		Silty Sand (SM) - very fine grained, 40% silt, poorly graded, very strong odor with saturation @ 53' BGL, discolored soil @ 50', gray color.
				60–69		Silty Sand (SM) - similar to above, occasional sandstone seams, FREE- PHASE HYDROCARBON NOTED IN RETURN PIT.
				70–79		Silty Sand (SM) - similar to above.
				80–87		Silty Sand (SM) - similar to above.
				88–94		Gravelly Sand (SW) - well graded, subangular gravel, granule to pebble sized, chert, increasing gravel content with depth, fine-medium sand, subangular.
				95–99		Total Depth 95' BGL

8" ID 0.020 MILL Slot Schedule 40 PVC Screen

8/16 Sieve sand filter pack

88.0

88.5 End Cap

95.0

WELL 19577 12/12/95

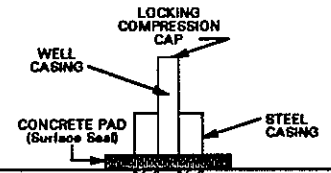
F-204A Austin (8-95)

WELL CONSTRUCTION LOG

WELL NO. RW-179

Client: FINA OIL AND CHEMICAL COMPANY	Start Date: 10-1-95	End Date: 10-1-95	Page 1 of 2
Site: Big Spring, Texas	Drilling Method: Air/ Wet Rotary		Project Number: 50-00195.77
Geologist: Tracy Payne	Driller: Diversified/Powell	Drill Rig Type: Mayhew 1000	Borehole Diameter: 14 Inches
Site Coordinates: N: 240641.6300 E: 792300.0700	Total Depth: 80.00	Surface Elevation (ft.): 2433.50	TOC Elevation (ft.): 2434.75 / PAD Elevation (ft.): 2433.75
Datum Description: GRADE LEVEL	Datum Elevation:	Water Level Depth Below TOC (ft): / Date: / Time:	

Sample Type	Recovery (feet)	Saturation	Field Test S.C. (mS)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
X				1–9		Silty Sand (SM) - very fine grained, 30-40% silt, poorly graded, loose, dry, reddish brown, no odor.
X				10–19		Silty Sand (SM) - similar to above, reddish tan.
X				20–29		Silty Sand (SM) - similar to above.
X				30–39		Silty Sand (SM) - similar to above, faint odor @ 35' BGL, increasing in intensity with depth.
X				40–49		Silty Sand (SM) - similar to above, very strong odor @ 45' BGL saturation @ 48'.



16" ID Steel surface casing to 5'

Cement/Bentonite Grout

8"ID Schedule 40 PVC riser

33.0 Stainless steel centralizer

Bentonite seal

36.0

43.0

8" ID 0.020 MILL Slot Schedule 40 PVC Screen

WELL 19677 12/12/95

F-204A Austin (8-95)

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WELL CONSTRUCTION LOG

WELL NO. RW-179

Client: FINA OIL AND CHEMICAL COMPANY	Start Date: 10-1-95	End Date: 10-1-95	Page 2 of 2
Site: Big Spring, Texas	Drilling Method: Air/ Wet Rotary		Project Number: 50-00195.77
Geologist: Tracy Payne	Driller: Diversified/Powell	Drill Rig Type: Mayhew 1000	Borehole Diameter: 14 Inches
Site Coordinates: N: 240641.6300 E: 792300.0700	Total Depth: 80.00	Surface Elevation (ft.): 2433.50	TOC Elevation (ft.): 2434.75 / PAD Elevation (ft.): 2433.75
Datum Description: GRADE LEVEL	Datum Elevation:	Water Level Depth Below TOC (ft): / Date:	Time:

Sample Type	Recovery (feet)	Saturation	Field Test S.C. (mS)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
X				51–59		Silty Sand (SM) - very fine grained, 30-40% silt, poorly graded, loose, reddish brown, with sandstone seams, emulsified oil in return pit.
X				60–69		Silty Sand (SM) - similar to above.
X				70–75		Silty Sand (SM) - similar to above.
				76–79		Clay (CH) - False Red Bed.
				80–99		Borehole Terminated at a depth of 80 feet BGL

8/16 Sieve sand filter pack

73.0 End Cap

73.5

80.0

WELL 19577 12/12/95

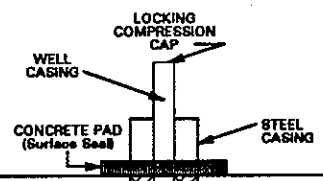
F-204A Austin (8-95)

WELL CONSTRUCTION LOG

WELL NO. RW-192

Client:		Start Date:	End Date:	Page of
FINA OIL AND CHEMICAL COMPANY		10-18-95	10-18-95	1 3
Site:		**Drilling Method:**		**Project Number:**
Big Spring, Texas		Air/Wet Rotary		50-00195.77
Geologist:	**Driller:**	**Drill Rig Type:**		**Borehole Diameter:**
Tracy Payne	Diversified/Powell	Mayhew 1000		14 Inches
Site Coordinates:	**Total Depth:**	**Surface Elevation (ft.):**	**TOC Elevation (ft.):**	**PAD Elevation (ft.):**
N: 240501.5200 E: 789968.5400	110.00	2459.94	2461.24	2460.19
Datum Description:	**Datum Elevation:**	**Water Level Depth Below TOC (ft):**	**Date:**	**Time:**
GRADE LEVEL				

Sample Type	Recovery (feet)	Saturation	Field Test S.C. (mS)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
X				1–7		Silty Sand (SM) - very fine grained, 30-40% silt, loose, dry, no odor, reddish brown.
X				8–9		Silty Sand (SM) - very fine grained, 20% silt, poorly graded, loose, dry, light tan, no odor, occasional sandstone seams.
X				10–19		Silty Sand (SM) - similar to above.
X				20–29		Sand (SW) - medium to fine grained, well graded, loose, dry, tan, no odor.
X				30–39		Sand (SW) - similar to above.
X				40–49		Sand (SW) - similar to above, increase in silt 20% @ 45' BGL.



16" ID Steel surface casing to 5'

Cement/Bentonite Grout

8"ID Schedule 40 PVC riser

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WELL CONSTRUCTION LOG

WELL NO. RW-192

Client: FINA OIL AND CHEMICAL COMPANY	Start Date: 10-18-95	End Date: 10-18-95	Page 2 of 3
Site: Big Spring, Texas	Drilling Method: Air/Wet Rotary		Project Number: 50-00195.77
Geologist: Tracy Payne / Driller: Diversified/Powell	Drill Rig Type: Mayhew 1000		Borehole Diameter: 14 Inches
Site Coordinates: N: 240501.5200 E: 789968.5400 / Total Depth: 110.00	Surface Elevation (ft.): 2459.94	TOC Elevation (ft.): 2461.24	PAD Elevation (ft.): 2460.19
Datum Description: GRADE LEVEL / Datum Elevation:	Water Level Depth Below TOC (ft):	Date:	Time:

Sample Type | Recovery (feet) | Saturation | Field Test S.C. (mS) | Depth (feet) | Stratigraphy

LITHOLOGIC DESCRIPTION

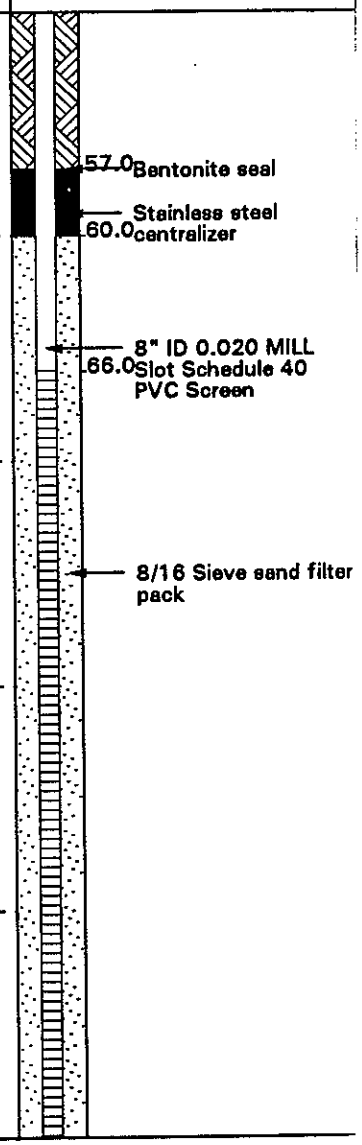
Silty Sand (SM) - very fine grained, 40% silt, poorly graded, loose, dry, no odor, tan.

Silty Sand (SM) - similar to above, odor @ 65' BGL, dry, occasional sandstone seams.

Silty Sand (SM) - similar to above, odor very strong, with discolored soil, saturation @ 73' BGL.

Silty Sand (SM) - similar to above, strong odor, free-phase hydrocarbon in return pit, occasional sandstone seams.

Silty Sand (SM) - similar to above, with occasional sandstone seams.



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WELL CONSTRUCTION LOG

WELL NO. RW-192

Client: FINA OIL AND CHEMICAL COMPANY	Start Date: 10-18-95	End Date: 10-18-95	Page 3 of 3
Site: Big Spring, Texas	Drilling Method: Air/Wet Rotary		Project Number: 50-00195.77
Geologist: Tracy Payne	Driller: Diversified/Powell	Drill Rig Type: Mayhew 1000	Borehole Diameter: 14 Inches
Site Coordinates: N: 240501.5200 E: 789968.5400	Total Depth: 110.00	Surface Elevation (ft.): 2459.94	TOC Elevation (ft.): 2461.24 / PAD Elevation (ft.): 2460.19
Datum Description: GRADE LEVEL	Datum Elevation:	Water Level Depth Below TOC (ft):	Date: / Time:

Sample Type	Recovery (feet)	Saturation	Field Test S.C. (mS)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				101–106		Gravelly Sand (SW) - subangular, fine-medium grained, loose, reddish brown, pebble sized gravel, chert, 10% gravel.
				106–110		Clay (CH) - mod-low plasticity, very soft, saturation light reddish brown. Dockum FM
				110		T.D. @ 110' BGL

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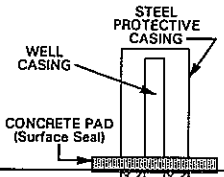
WELL CONSTRUCTION LOG

WELL NO. RW-194

Client:		Start Date:	End Date:	Page of
FINA OIL AND CHEMICAL COMPANY		10-2-96	10-2-96	1 3
Site:		Drilling Method:		Project Number:
BIG SPRING, TEXAS		AIR/WET ROTARY		50-01858.16
Geologist:	Driller:	Drill Rig Type:		Borehole Diameter:
BRAD STOKES	CHOATE WELL SERVICE	GARDNER DENVER 1500		7.88 Inches
Site Coordinates, UTM in ft.:	Total Depth (ft-bgl):	Surface Elevation(ft)	TOC Elevation(ft)	PAD Elevation(ft)
N: 239498.8500 E: 794005.0200	120.00	2441.50	2441.86	2443.89
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (feet)	Saturation	OVM (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				1-3		Clayey Sand (SC) - Fine to medium, with 15% clay, some silt, damp, reddish brown.
				4-5		Caliche from 4-5 feet, dry, hard, white.
				6-9		Silty Sand (SM) - Very fine grained, with 25-35% silt, compact, dry, pink to reddish tan color, lithology remains the same between cemented zones.
				10-19		Silty Sand (SM) - Similar to above.
				20-29		Silty Sand (SM) - Similar to above. Lightly cemented zone, carbonate cement. Lightly cemented zone, carbonate cement.
				30-39		Silty Sand (SM) - Similar to above.
				40-49		Silty Sand (SM) - Similar to above. Lightly cemented zone, carbonate cement.



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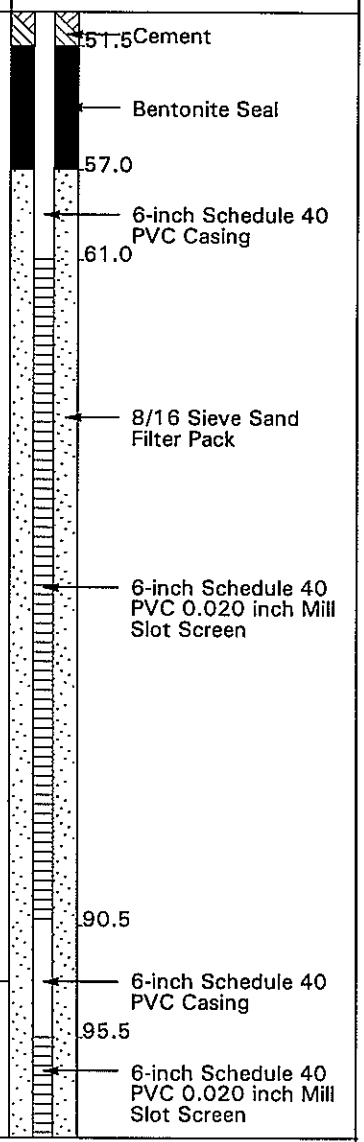
WELL CONSTRUCTION LOG

WELL NO. RW-194

Client:		Start Date:	End Date:	Page of
FINA OIL AND CHEMICAL COMPANY		10-2-96	10-2-96	2 3
Site:		Drilling Method:		Project Number:
BIG SPRING, TEXAS		AIR/WET ROTARY		50-01858.16
Geologist:	Driller:	Drill Rig Type:		Borehole Diameter:
BRAD STOKES	CHOATE WELL SERVICE	GARDNER DENVER 1500		7.88 Inches
Site Coordinates, UTM in ft.:	Total Depth (ft-bgl):	Surface Elevation(ft)	TOC Elevation(ft)	PAD Elevation(ft)
N: 239498.8500 E: 794005.0200	120.00	2441.50	2441.86	2443.89
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (feet)	Saturation	OVM (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				51–99		Silty Sand (SM) - Very fine grained with 25-35% silt, compact, dry, pink to reddish tan color, lithology remains the same between cemented zones. Lightly cemented zone, carbonate cement. Lightly cemented zone, carbonate cement. Silty Sand (SM) - Similar to above. Water level at 63 feet after 45 minutes Becomes damp below 64 feet. Saturated below 67 feet. Silty Sand (SM) - Similar to above. Silty Sand (SM) - Similar to above. Lightly cemented, sandstone. Clayey Silty Sand (SC/SM) - Shaley/clayey, red, "False Red Bed". Sandy Gravel (GW) - Well rounded to subrounded, chert and quartz, with 20% medium grained sand, multicolored, also limestone and shell fragments, granule to pebble sized.



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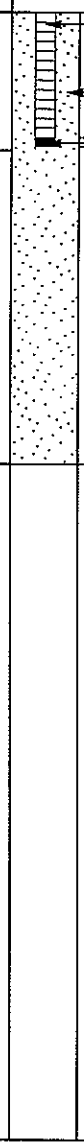
WELL CONSTRUCTION LOG

WELL NO. RW-194

Client: FINA OIL AND CHEMICAL COMPANY	Start Date: 10-2-96	End Date: 10-2-96	Page 3 of 3
Site: BIG SPRING, TEXAS	Drilling Method: AIR/WET ROTARY		Project Number: 50-01858.16
Geologist: BRAD STOKES	Driller: CHOATE WELL SERVICE	Drill Rig Type: GARDNER DENVER 1500	Borehole Diameter: 7.88 Inches
Site Coordinates, UTM in ft.: N: 239498.8500 E: 794005.0200	Total Depth (ft-bgl): 120.00	Surface Elevation(ft) 2441.50	TOC Elevation(ft) 2441.86 / PAD Elevation(ft) 2443.89
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date: / Time:

Sample Type	Recovery (feet)	Saturation	OVM (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				101–106		Sandy Gravel (GW) - Well rounded to subrounded, chert and quartz, with 20% medium grained sand, multicolored, also limestone and shell fragments, granule to pebble sized. Large gravel, loosing circulation, no cuttings return.
				107–120		Silty Clay (CL) - Moderate plasticity with 15-20% silt in matrix, hard, dry, brick red color, Dockum Formation. Silty Clay (CL) - Similar to above.
				120		BORING TERMINATED AT 120 FEET BELOW GRADE



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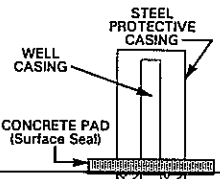
WELL CONSTRUCTION LOG

WELL NO. RW-195

Client:		Start Date:	End Date:	Page of
FINA OIL AND CHEMICAL COMPANY		10-3-96	10-3-96	1 3
Site:		Drilling Method:		Project Number:
BIG SPRING, TEXAS		AIR/WET ROTARY		50-01858.16
Geologist:	Driller:	Drill Rig Type:		Borehole Diameter:
BRAD STOKES	CHOATE WELL SERVICE	GARDNER DENVER 1500		7.88 Inches
Site Coordinates, UTM in ft.:	Total Depth (ft-bgl):	Surface Elevation(ft)	TOC Elevation(ft)	PAD Elevation(ft)
N: 238360.1700 E: 793840.4600	100.00	2432.20	2434.41	2432.42
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (feet)	Saturation	OVM (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				1		Topsoil - Compact silty sand, dry to damp, brown.
				2 3		Clayey Sand (SC) - Low plasticity with 15-20% clay fines, damp, reddish brown to red color.
				4		Caliche
				5 6 7 8 9		Silty Sand (SM) - Very fine grained with 25-35% silt, compact, dry, pink to tan color with occasional lightly cemented seams throughout, lithology remains the same between cemented zones.
				10 11 12 13 14 15 16 17 18 19		Silty Sand (SM) - Similar to above. Some cemented zones from 10-20 feet.
				20 21 22 23 24 25 26 27 28 29		Silty Sand (SM) - Similar to above.
				30 31 32 33 34 35 36 37 38 39		Silty Sand (SM) - Similar to above.



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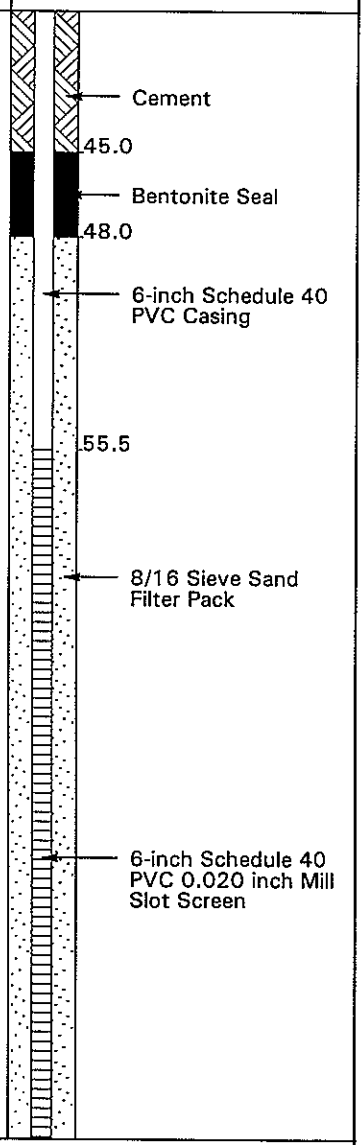
WELL CONSTRUCTION LOG

WELL NO. RW-195

Client: FINA OIL AND CHEMICAL COMPANY		Start Date: 10-3-96	End Date: 10-3-96	Page 2 of 3
Site: BIG SPRING, TEXAS		Drilling Method: AIR/WET ROTARY		Project Number: 50-01858.16
Geologist: BRAD STOKES	Driller: CHOATE WELL SERVICE	Drill Rig Type: GARDNER DENVER 1500		Borehole Diameter: 7.88 Inches
Site Coordinates, UTM in ft.: N: 238360.1700 E: 793840.4600	Total Depth (ft-bgl): 100.00	Surface Elevation(ft) 2432.20	TOC Elevation(ft) 2434.41	PAD Elevation(ft) 2432.42
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (feet)	Saturation	OVM (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				41–79		Silty Sand (SM) - Very fine grained with 25-35% silt, compact, dry, pink to tan color with occasional lightly cemented seams throughout, lithology remains the same between cemented zones. Cemented zones from 41 to 56 feet.
						Silty Sand (SM) - Similar to above.
						Silty Sand (SM) - Similar to above. Becomes damp below 61 feet, more cemented zones. Saturated below 63 feet, slight odor.
						Silty Sand (SM) - Similar to above.



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WELL CONSTRUCTION LOG

WELL NO. RW-195

Client: FINA OIL AND CHEMICAL COMPANY	Start Date: 10-3-96	End Date: 10-3-96	Page 3 of 3
Site: BIG SPRING, TEXAS	Drilling Method: AIR/WET ROTARY		Project Number: 50-01858.16
Geologist: BRAD STOKES	Driller: CHOATE WELL SERVICE	Drill Rig Type: GARDNER DENVER 1500	Borehole Diameter: 7.88 Inches
Site Coordinates, UTM in ft.: N: 238360.1700 E: 793840.4600	Total Depth (ft-bgl): 100.00	Surface Elevation(ft) 2432.20	TOC Elevation(ft) 2434.41 / PAD Elevation(ft) 2432.42
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date: / Time:

Sample Type | Recovery (feet) | Saturation | OVM (ppm) | Depth (feet) | Stratigraphy

LITHOLOGIC DESCRIPTION

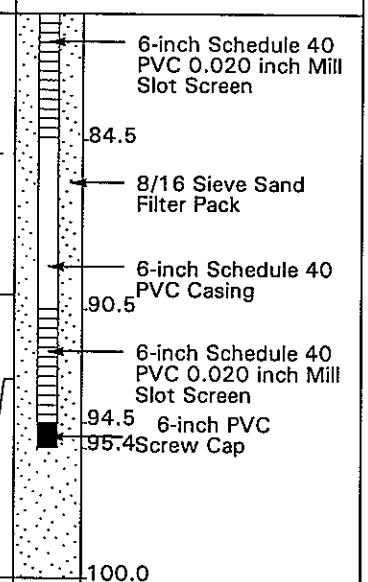
Silty Sand (SM) - Very fine grained with 25-35% silt, compact, dry, pink to tan color with occasional lightly cemented seams throughout, lithology remains the same between cemented zones.

Clayey Silty Sand (SC/SM) - Clayey sand, red, "False Red Bed".

Sandy Gravel (GW) - Well graded, granule to pebbled sized, chert, quartz, shells, limestone, with 35-45% fine to medium quartz sand, rounded, multicolored- tan, red, black, pink, white, about 10-15% granule sized, low sphericity (platy) shell material.

Silty Clay (CL) - Moderate plasticity with 15-20% silt in matrix, hard, shaley texture, dry, brick red color, Dockum Formation.

BORING TERMINATED AT 100 FEET BELOW GRADE



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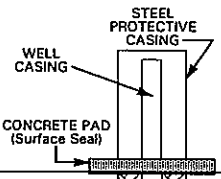
WELL CONSTRUCTION LOG

WELL NO. RW-196

Client: FINA OIL AND CHEMICAL COMPANY		Start Date: 10-3-96	End Date: 10-3-96	Page 1 of 3
Site: BIG SPRING, TEXAS		Drilling Method: AIR/WET ROTARY		Project Number: 50-01858.16
Geologist: BRAD STOKES	Driller: CHOATE WELL SERVICES	Drill Rig Type: GARDNER DENVER 1500		Borehole Diameter: 7.88 Inches
Site Coordinates, UTM in ft.: N: 238163.7700 E: 792920.5100	Total Depth (ft-bgl): 120.00	Surface Elevation(ft) 2438.00	TOC Elevation(ft) 2440.73	PAD Elevation(ft) 2438.49
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (feet)	Saturation	OVM (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				1–5		Top Soil - Silty sand(brown), and clayey sand(red).
				3–5		Caliche
				6–9		Silty Sand (SM) - Very fined grained with 25-35% silt in matrix, quartz sand, dry, compact, with occasional lightly cemented zone, pink to reddish tan.
				10–12		Silty Sand (SM) - Similar to above.
				13–19		Cemented zone.
				20–23		Silty Sand (SM) - Similar to above. Cemented zone.
				30–34		Silty Sand (SM) - Similar to above. Cemented zone, carbonate cement, light tan color.
				40–43		Silty Sand (SM) - Similar to above.



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WELL CONSTRUCTION LOG

WELL NO. RW-196

Client: FINA OIL AND CHEMICAL COMPANY	Start Date: 10-3-96	End Date: 10-3-96	Page 2 of 3
Site: BIG SPRING, TEXAS	Drilling Method: AIR/WET ROTARY		Project Number: 50-01858.16
Geologist: BRAD STOKES	Driller: CHOATE WELL SERVICES	Drill Rig Type: GARDNER DENVER 1500	Borehole Diameter: 7.88 Inches
Site Coordinates, UTM in ft.: N: 238163.7700 E: 792920.5100	Total Depth (ft-bgl): 120.00	Surface Elevation(ft): 2438.00	TOC Elevation(ft): 2440.73 / PAD Elevation(ft): 2438.49
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date: / Time:

Sample Type | Recovery (feet) | Saturation | OVM (ppm) | Depth (feet) | Stratigraphy

LITHOLOGIC DESCRIPTION

Silty Sand (SM) - Very fined grained with 25-35% silt in matrix, quartz sand, dry, compact, with occasional lightly cemented zone, light tan color.

Cemented zone.

Silty Sand (SM) - Similar to above.

Cemented zone, hard, damp.

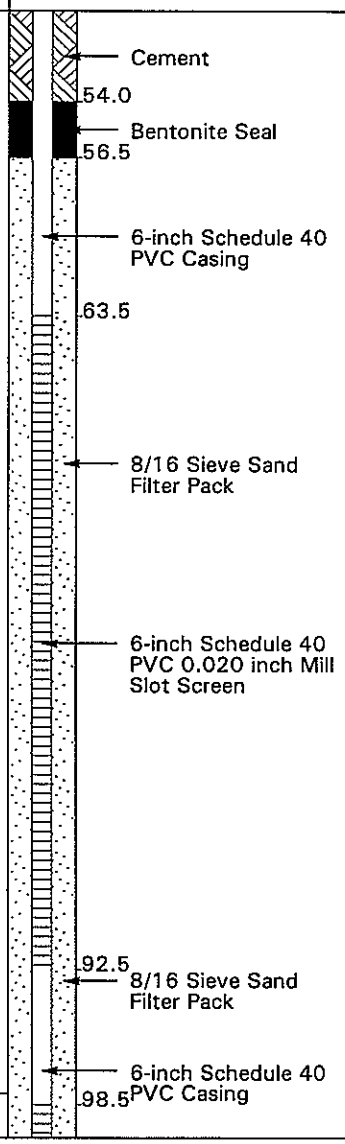
Saturated below 68 feet, odor.

Silty Sand (SM) - Similar to above.

Silty Sand (SM) - Similar to above.

Clayey Silty Sand (SC/SM) - Clayey sand, red color, "False Red Bed".

Sandy Gravel (GW) - Granule to pebbled sized, rounded, quartz, chert, limestone shells, well graded, with 20-25%



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WELL CONSTRUCTION LOG

WELL NO. RW-196

Client:		Start Date:	End Date:	Page of
FINA OIL AND CHEMICAL COMPANY		10-3-96	10-3-96	3 3
Site:		Drilling Method:		Project Number:
BIG SPRING, TEXAS		AIR/WET ROTARY		50-01858.16
Geologist:	Driller:	Drill Rig Type:		Borehole Diameter:
BRAD STOKES	CHOATE WELL SERVICES	GARDNER DENVER 1500		7.88 Inches
Site Coordinates, UTM in ft.:	Total Depth (ft-bgl):	Surface Elevation(ft)	TOC Elevation(ft)	PAD Elevation(ft)
N: 238163.7700 E: 792920.5100	120.00	2438.00	2440.73	2438.49
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (feet)	Saturation	OVM (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				01–20		medium to fine quartz sand, multicolored shell fragments are platy.
				03–20		Silty Clay (CL) - Medium to low plasticity, dry, friable-shaley texture with 15-20% silt in matrix, brick red color, Dockum Formation.
				21		BORING TERMINATED AT 120 FEET BELOW GRADE

PVC Slot Screen

103.0
103.4 6-inch PVC Screw Cap

8/16 Sieve Sand Filter Pack

120.0

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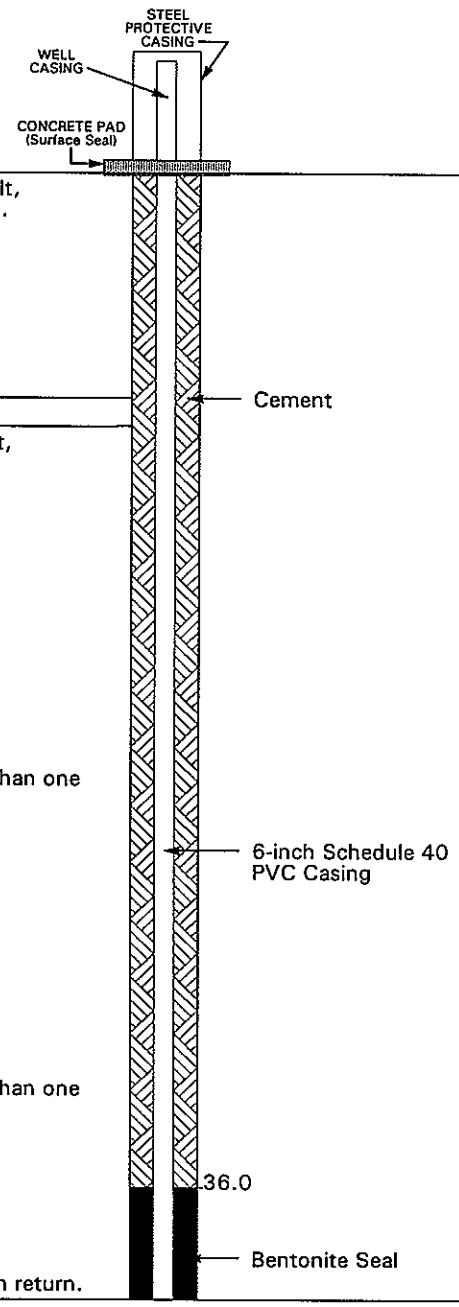
WELL CONSTRUCTION LOG

WELL NO. RW-197

Client: FINA OIL AND CHEMICAL COMPANY		Start Date: 10-7-96	End Date: 10-7-96	Page 1 of 3
Site: BIG SPRING, TEXAS		Drilling Method: AIR/MUD ROTARY		Project Number: 50-01858.16
Geologist: TRACY PAYNE	Driller: CHOATE WELL SERVICE	Drill Rig Type: GARDNER-DENVER 1500		Borehole Diameter: 12.25 Inches
Site Coordinates, UTM in ft.: N: 237968.1600 E: 792117.3900	Total Depth (ft-bgl): 100.00	Surface Elevation(ft) 2417.50	TOC Elevation(ft) 2419.37	PAD Elevation(ft) 2417.70
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Depth (feet)	LITHOLOGIC DESCRIPTION
1–8	Silty Sand (SM) - Very fine grained with 25-35% silt, compact, dry, pink to reddish tan.
8–9	Caliche - Hard, dry, white.
9–10	Silty Sand(SM) - Very fine grained with 20-35% silt, compact, dry, pink to tan.
10–11	Silty Sand (SM) - Similar to above.
20–21	Silty Sand (SM) - Similar as above.
21	Lightly cemented sandstone seam at 21 feet; less than one foot in thickness.
30–31	Silty Sand (SM) - Similar to above.
32	Lightly cemented sandstone seam at 32 feet; less than one foot thick.
39	Cemented SS seam at 39' with 1 in. pieces of SS in return.



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WELL CONSTRUCTION LOG

WELL NO. RW-197

Client: FINA OIL AND CHEMICAL COMPANY	Start Date: 10-7-96	End Date: 10-7-96	Page 2 of 3
Site: BIG SPRING, TEXAS	Drilling Method: AIR/MUD ROTARY		Project Number: 50-01858.16
Geologist: TRACY PAYNE	Driller: CHOATE WELL SERVICE	Drill Rig Type: GARDNER-DENVER 1500	Borehole Diameter: 12.25 Inches
Site Coordinates, UTM in ft.: N: 237968.1600 E: 792117.3900	Total Depth (ft-bgl): 100.00	Surface Elevation(ft) 2417.50 / TOC Elevation(ft) 2419.37	PAD Elevation(ft) 2417.70
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft): / Date:	Time:

Sample Type | Recovery (feet) | Saturation | OVM (ppm) | Depth (feet) | Stratigraphy

LITHOLOGIC DESCRIPTION

Silty Sand (SM) - Very fine grained with 20-35% silt, compact, dry, pink to tan, with occasional sandstone seams.

Silty Sand (SM) - Similar to above except damp at 50 feet increasing in moisture to 60 feet, white poorly cemented, odor at 50 feet

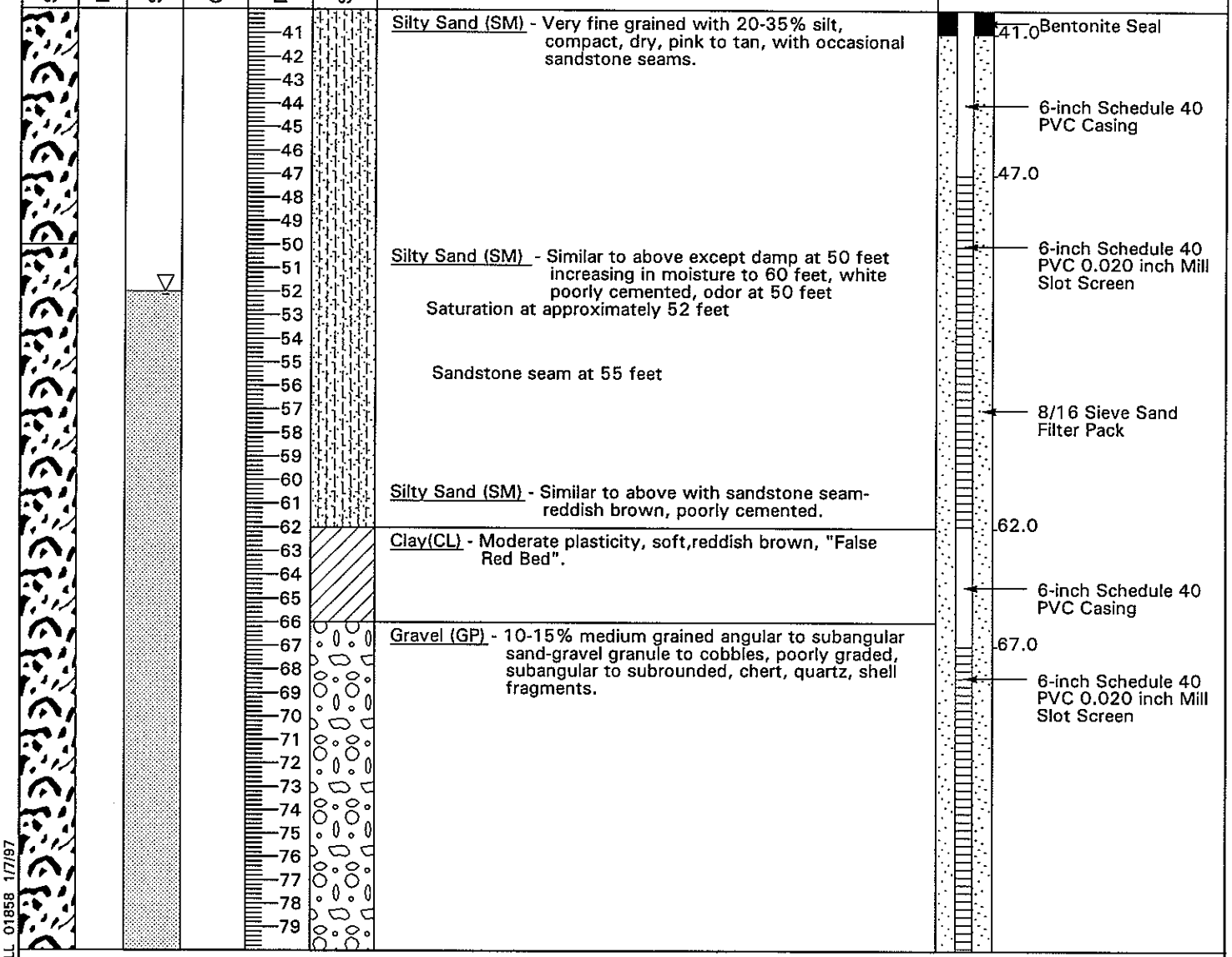
Saturation at approximately 52 feet

Sandstone seam at 55 feet

Silty Sand (SM) - Similar to above with sandstone seam- reddish brown, poorly cemented.

Clay(CL) - Moderate plasticity, soft,reddish brown, "False Red Bed".

Gravel (GP) - 10-15% medium grained angular to subangular sand-gravel granule to cobbles, poorly graded, subangular to subrounded, chert, quartz, shell fragments.



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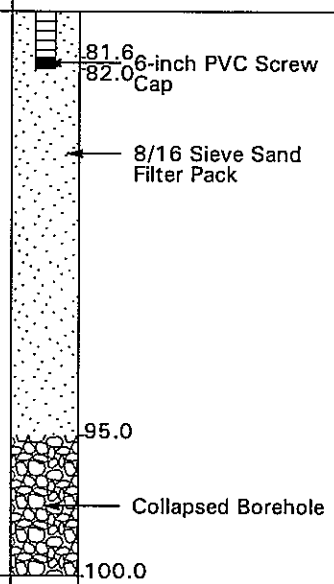
WELL CONSTRUCTION LOG

WELL NO. RW-197

Client: FINA OIL AND CHEMICAL COMPANY	Start Date: 10-7-96	End Date: 10-7-96	Page 3 of 3
Site: BIG SPRING, TEXAS	Drilling Method: AIR/MUD ROTARY		Project Number: 50-01858.16
Geologist: TRACY PAYNE	Driller: CHOATE WELL SERVICE	Drill Rig Type: GARDNER-DENVER 1500	Borehole Diameter: 12.25 Inches
Site Coordinates, UTM in ft.: N: 237968.1600 E: 792117.3900	Total Depth (ft-bgl): 100.00	Surface Elevation(ft): 2417.50	TOC Elevation(ft): 2419.37 / PAD Elevation(ft): 2417.70
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date: / Time:

Sample Type	Recovery (feet)	Saturation	OVM (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				81–100		Clay (CH) - Highly plastic, stiff, dry, red, Dockum Formation.
				90–100		Clay (CH) - Similar to above, shaley, very stiff.
				101		BORING TERMINATED AT 100 FEET BELOW GRADE



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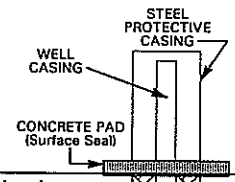
WELL CONSTRUCTION LOG

WELL NO. RW-198

Client: FINA OIL AND CHEMICAL COMPANY		Start Date: 10-8-96	End Date: 10-8-96	Page 1 of 3
Site: BIG SPRING, TEXAS		Drilling Method: AIR/MUD ROTARY		Project Number: 50-01858.16
Geologist: TRACY PAYNE	Driller: CHOATE WELL SERVICE	Drill Rig Type: GARDNER-DENVER 1500		Borehole Diameter: 12.25 Inches
Site Coordinates, UTM in ft.: N: 237508.4400 E: 790200.2900	Total Depth (ft-bgl): 100.00	Surface Elevation(ft) 2430.80	TOC Elevation(ft) 2433.13	PAD Elevation(ft) 2431.15
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (feet)	Saturation	OVM (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				1		Sandy Clay (CL) - Low plasticity, 20% very fine grained sand, firm, dry, brown.
				2		Silty Sand (SM) - Very fined grained with 25-35% silt, compact, dry, pink to light reddish tan.
				3		
				4		
				5		
				6		
				7		
				8		
				9		
				10		Silty Sand (SM) - Similar to above except darker reddish tan with occasional sandstone seams.
				11		
				12		
				13		
				14		
				15		Color changes to a very light tan
				16		
				17		
				18		
				19		
				20		Silty Sand (SM) - Similar to above, very fined grained with 25-35 % silt, color changes to a reddish tan, 5% caliche nodules/gravel, dry to damp.
				21		
				22		
				23		
				24		
				25		
				26		
				27		
				28		
				29		
				30		Silty Sand (SM) - Similar to above except silt decreases to 20%, sand grains very fine to fine, damp, compact.
				31		
				32		
				33		
				34		
				35		
				36		
				37		
				38		
				39		



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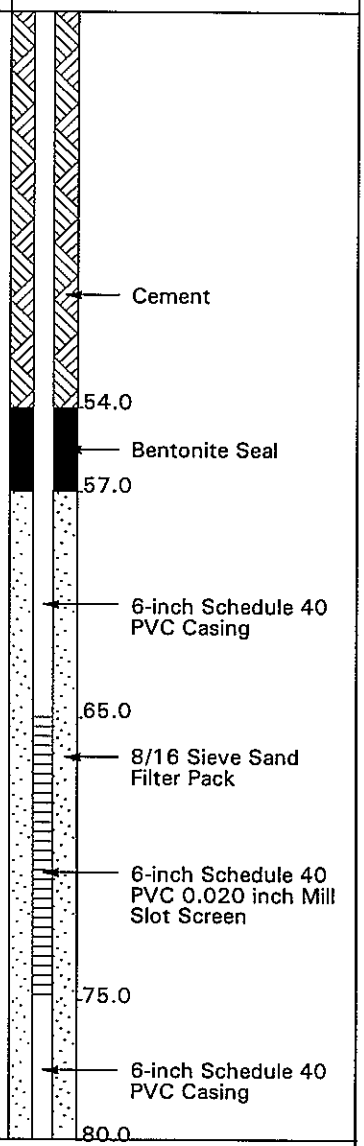
WELL CONSTRUCTION LOG

WELL NO. RW-198

Client: FINA OIL AND CHEMICAL COMPANY		Start Date: 10-8-96	End Date: 10-8-96	Page 2 of 3
Site: BIG SPRING, TEXAS		Drilling Method: AIR/MUD ROTARY		Project Number: 50-01858.16
Geologist: TRACY PAYNE	Driller: CHOATE WELL SERVICE	Drill Rig Type: GARDNER-DENVER 1500		Borehole Diameter: 12.25 Inches
Site Coordinates, UTM in ft.: N: 237508.4400 E: 790200.2900	Total Depth (ft-bgl): 100.00	Surface Elevation(ft) 2430.80	TOC Elevation(ft) 2433.13	PAD Elevation(ft) 2431.15
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (feet)	Saturation	OVM (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				41-79		Silty Sand (SM) - Very fined grained, 20% silt, very dense, reddish brown with occasional sandstone gravel, damp.
						Silty Sand (SM) - Similar to above.
						Sandstone seam at 56 feet; color changes light reddish tan, compact.
						Silty Sand (SM) - Similar to above, compact to dense.
						Sandstone seam at 64 feet; white, poorly cemented, (tan to light gray in color)
						Saturation at 68 feet
						Silty Sand (SM) - Similar to above with light gray in color and occasional sandstone seams, moist to saturated at 70 feet, dense to very dense.
						Sandstone at 75 feet (added water to help circulate cuttings)



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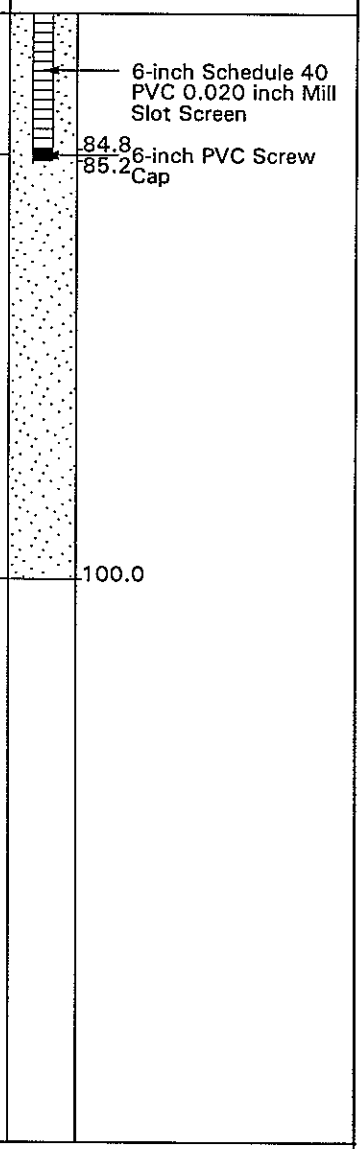
WELL CONSTRUCTION LOG

WELL NO. RW-198

Client: FINA OIL AND CHEMICAL COMPANY		Start Date: 10-8-96	End Date: 10-8-96	Page 3 of 3
Site: BIG SPRING, TEXAS		Drilling Method: AIR/MUD ROTARY		Project Number: 50-01858.16
Geologist: TRACY PAYNE	Driller: CHOATE WELL SERVICE	Drill Rig Type: GARDNER-DENVER 1500		Borehole Diameter: 12.25 Inches
Site Coordinates, UTM in ft.: N: 237508.4400 E: 790200.2900	Total Depth (ft-bgl): 100.00	Surface Elevation(ft) 2430.80	TOC Elevation(ft) 2433.13	PAD Elevation(ft) 2431.15
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (feet)	Saturation	OVM (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				81–100		Gravel (GP) - Angular to subrounded, loose, granule to large pebble, chert, quartz, shell fragments, poorly sorted, <15% coarse sand.
				85–100		Clay (CH) Highly plastic, shaley, firm, dry, red, Dockum Formation.
				100		BORING TERMINATED AT 100 FEET BELOW GRADE



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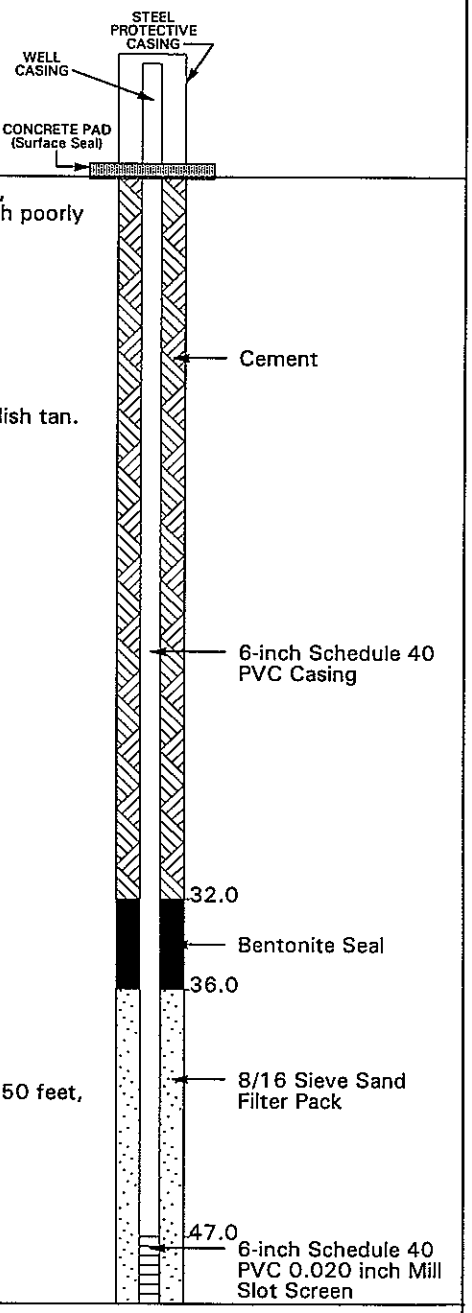
WELL CONSTRUCTION LOG

WELL NO. RW-199

Client:		Start Date:	End Date:	Page of
FINA OIL AND CHEMICAL COMPANY		10-10-96	10-10-96	1 2
Site:		Drilling Method:		Project Number:
BIG SPRING, TEXAS		AIR/MUD ROTARY		50-01858.16
Geologist:	Driller:	Drill Rig Type:		Borehole Diameter:
TRACY PAYNE	CHOATE WELL SERVICE	GARDNER-DENVER 1500		12.25 Inches
Site Coordinates, UTM in ft.:	Total Depth (ft-bgl):	Surface Elevation(ft)	TOC Elevation(ft)	PAD Elevation(ft)
N: 237741.6900 E: 791037.9600	95.00	2419.80	2440.42	2420.13
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (feet)	Saturation	OVM (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				1–9		Silty Sand (SM) - Very fine grained with 20-30% silt, compact, dry, light reddish tan with poorly cemented nodules.
				10–19		Silty Sand (SM) - Similar to above except darker reddish tan.
				20–30		Silty Sand (SM) - Similar to above.
				31–35		Silty Sand (SM) - Similar to above. Damp at 35 feet
		▽		36–49		Silty Sand (SM) - Similar to above, damp to moist at 50 feet, added water to circulate cuttings.



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WELL CONSTRUCTION LOG

WELL NO. RW-199

Client: FINA OIL AND CHEMICAL COMPANY	Start Date: 10-10-96	End Date: 10-10-96	Page 2 of 2
Site: BIG SPRING, TEXAS	Drilling Method: AIR/MUD ROTARY		Project Number: 50-01858.16
Geologist: TRACY PAYNE	Driller: CHOATE WELL SERVICE	Drill Rig Type: GARDNER-DENVER 1500	Borehole Diameter: 12.25 Inches
Site Coordinates, UTM in ft.: N: 237741.6900 E: 791037.9600	Total Depth (ft-bgl): 95.00	Surface Elevation(ft) 2419.80 / TOC Elevation(ft) 2440.42	PAD Elevation(ft) 2420.13
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft): / Date:	Time:

Sample Type | Recovery (feet) | Saturation | OVM (ppm) | Depth (feet) | Stratigraphy

LITHOLOGIC DESCRIPTION

Silty Sand (SM) - Very fine grained with 20-30% silt, compact, dark reddish tan with poorly cemented nodules, saturation at 50 feet.

Sandstone seam at 60 feet, saturated

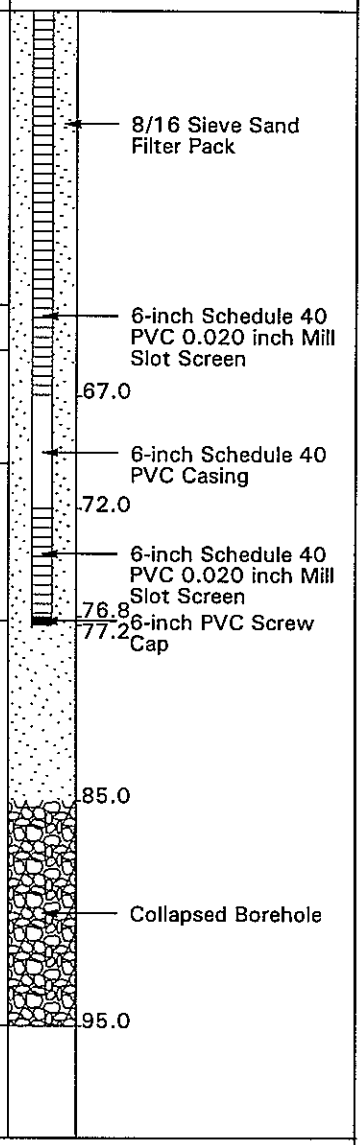
Clay (CH) - Moderately plastic, soft, reddish brown, "False Red Bed".

Sand (SP) - Fine grained, loose, saturated, red.

Gravelly Sand (GP) - Fine grained, loose, red, well sorted with 40-50% gravel- chert, quartz, angular, granule to pebble with larger pebbles at bottom.

Clay (CH) - Highly plastic, stiff, dry, red, Dockum Formation.

BORING TERMINATED AT 95 FEET BELOW GRADE



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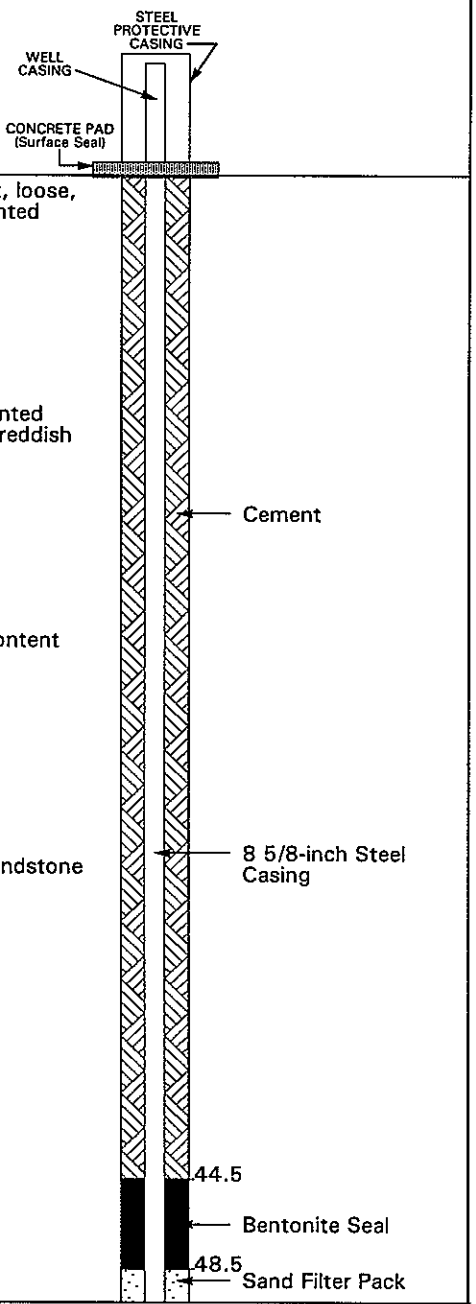
WELL CONSTRUCTION LOG

RMT INC.

WELL NO. RIW-200

Client:		Start Date:	End Date:	Page of
FINA OIL AND CHEMICAL COMPANY		10-15-96	10-31-96	1 3
Site:		Drilling Method:		Project Number:
BIG SPRING, TEXAS		AIR/MUD ROTARY		50-01858.16
Geologist:	Driller:	Drill Rig Type:		Borehole Diameter:
TRACY PAYNE	CHOATE WELL SERVICE	GARDNER-DENVER 1500		12.25 Inches
Site Coordinates, UTM in ft.:	Total Depth (ft-bgl):	Surface Elevation(ft)	TOC Elevation(ft)	PAD Elevation(ft)
N: 240000.2700 E: 793109.5000	120.00	2445.69	2448.24	2446.55
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (feet)	Saturation	OVM (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				1-49		Silty Sand (SM) - Very fine grained with 35-40% silt, loose, dry, reddish tan with poorly cemented nodules.
				10-12		Silty Sand (SM) - Similar to above, moderately cemented zone at 10 feet, color varies from reddish tan to a very light pinkish tan.
				20-21		Silty Sand (SM) - Similar to above, decrease in silt content 20-30%.
				30-31		Silty Sand (SM) - Similar to above, well cemented sandstone at 30 feet(<1 foot thick).
				40-41		Silty Sand (SM) - Similar to above except darker tan.



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WELL CONSTRUCTION LOG

WELL NO. RIW-200

Client: FINA OIL AND CHEMICAL COMPANY		Start Date: 10-15-96	End Date: 10-31-96	Page 2 of 3
Site: BIG SPRING, TEXAS		Drilling Method: AIR/MUD ROTARY		Project Number: 50-01858.16
Geologist: TRACY PAYNE	Driller: CHOATE WELL SERVICE	Drill Rig Type: GARDNER-DENVER 1500		Borehole Diameter: 12.25 Inches
Site Coordinates, UTM in ft.: N: 240000.2700 E: 793109.5000	Total Depth (ft-bgl): 120.00	Surface Elevation(ft) 2445.69	TOC Elevation(ft) 2448.24	PAD Elevation(ft) 2446.55
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (feet)	Saturation	OVM (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				51–99		Silty Sand (SM) - Very fine grained with 20-30% silt, loose, dry, dark tan with poorly cemented nodules.
						Damp at 55 feet.
						Silty Sand (SM) - Similar to above, light brown, increase in moisture content.
		▽				Saturated at 67 feet.
						Silty Sand (SM) - Similar to above, saturated.
						Silty Sand (SM) - Similar to above with occasional sandstone seams, poor to moderately cemented, odor.
						Silty Sand (SM) - Similar to above.
						Sandy Gravel (GW) - 20% sand, coarse grained, subangular gravel- subrounded to subangular, granule to large pebbles, well graded, chert, quartz, limestone, shell fragments, odor.
						Sandy Gravel (GW) - Similar to above except larger pebbles.

8 5/8-inch Steel Casing

57.0

8/16 Sieve Sand Filter Pack

8-inch Stainless Steel 0.02 Slot Vee-Wire Screen

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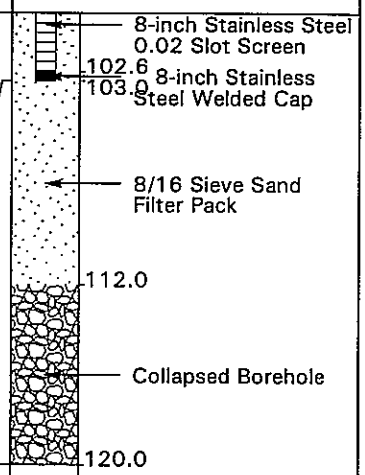
WELL CONSTRUCTION LOG

WELL NO. RIW-200

Client: FINA OIL AND CHEMICAL COMPANY		Start Date: 10-15-96	End Date: 10-31-96	Page 3 of 3
Site: BIG SPRING, TEXAS		Drilling Method: AIR/MUD ROTARY		Project Number: 50-01858.16
Geologist: TRACY PAYNE	Driller: CHOATE WELL SERVICE	Drill Rig Type: GARDNER-DENVER 1500		Borehole Diameter: 12.25 Inches
Site Coordinates, UTM in ft.: N: 240000.2700 E: 793109.5000	Total Depth (ft-bgl): 120.00	Surface Elevation(ft) 2445.69	TOC Elevation(ft) 2448.24	PAD Elevation(ft) 2446.55
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (feet)	Saturation	OVM (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				101–120		Sandy Gravel (GW) - 20% sand, coarse grained, subangular gravel - subrounded to subangular, granule to large pebbles, well graded, chert, quartz, limestone, shell fragments, odor.
				101–120		Clay (CH) - High plasticity, stiff, dry, red, Dockum Formation.
				101–120		Clay (CH) - Similar to above.
				120–149		BORING TERMINATED AT 120 FEET BELOW GRADE



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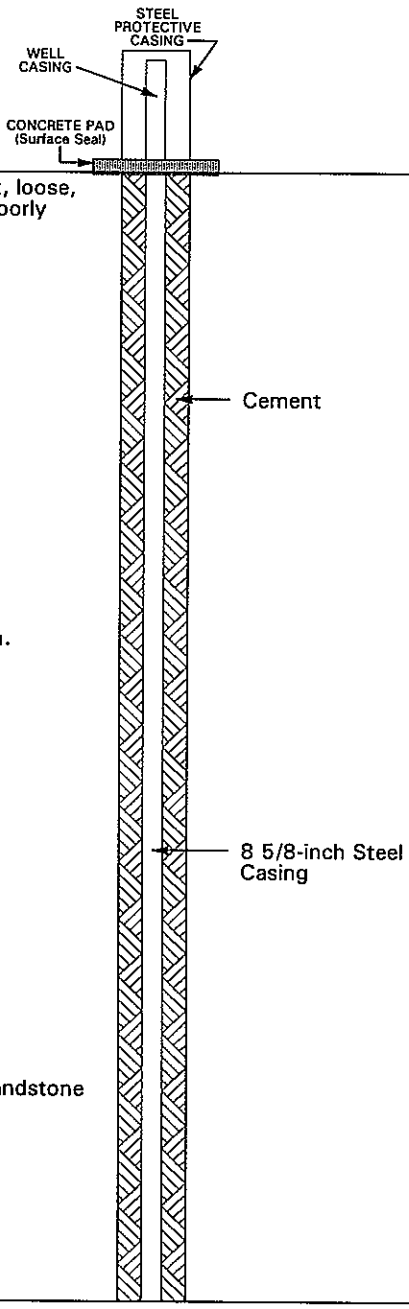
WELL CONSTRUCTION LOG

WELL NO. RIW-201

Client: FINA OIL AND CHEMICAL COMPANY		Start Date: 10-16-96	End Date: 11-2-96	Page 1 of 3
Site: BIG SPRING, TEXAS		Drilling Method: AIR/MUD ROTARY		Project Number: 50-01858.16
Geologist: TRACY PAYNE	Driller: CHOATE WELL SERVICE	Drill Rig Type: GARDNER-DENVER 1500		Borehole Diameter: 12.25 Inches
Site Coordinates, UTM in ft.: N: 239620.4500 E: 793220.2200	Total Depth (ft-bgl): 120.00	Surface Elevation(ft) 2444.60	TOC Elevation(ft) 2447.24	PAD Elevation(ft) 2445.11
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (feet)	Saturation	OVM (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				1–49		Silty Sand (SM) - Very fine grained with 35-40% silt, loose, dry, reddish tan with occasional poorly cemented sandstone nodules.
						Silty Sand (SM) - Similar to above except tan.
						Silty Sand (SM) - Similar to above except reddish tan.
						Silty Sand (SM) - Similar to above.
						Silty Sand (SM) - Similar to above with occasional sandstone seams.
						Sandstone seam at 45 feet.



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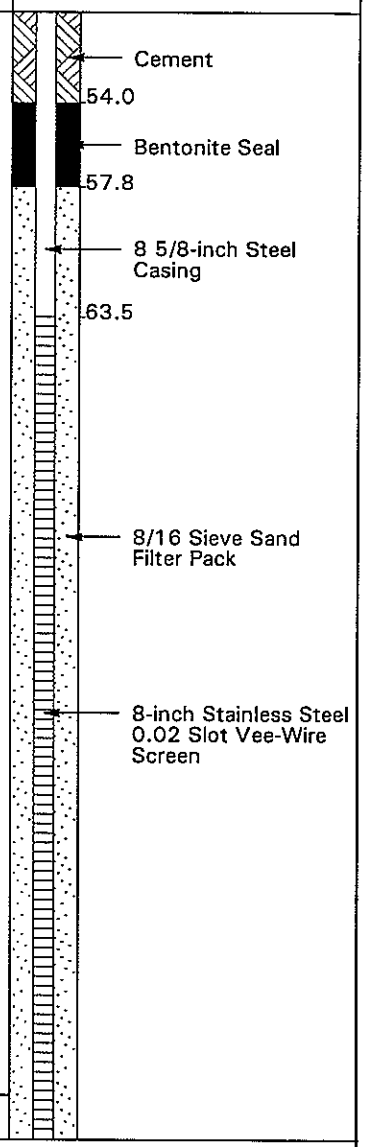
WELL CONSTRUCTION LOG

WELL NO. RIW-201

Client: FINA OIL AND CHEMICAL COMPANY		Start Date: 10-16-96	End Date: 11-2-96	Page 2 of 3
Site: BIG SPRING, TEXAS		Drilling Method: AIR/MUD ROTARY		Project Number: 50-01858.16
Geologist: TRACY PAYNE	Driller: CHOATE WELL SERVICE	Drill Rig Type: GARDNER-DENVER 1500		Borehole Diameter: 12.25 Inches
Site Coordinates, UTM in ft.: N: 239620.4500 E: 793220.2200	Total Depth (ft-bgl): 120.00	Surface Elevation(ft) 2444.60	TOC Elevation(ft) 2447.24	PAD Elevation(ft) 2445.11
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (feet)	Saturation	OVM (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				51-54		Silty Sand (SM) - Very fine grained with 35-40% silt, loose, dry, reddish tan with occasional sandstone seams.
				55-60		
				61-63		Silty Sand (SM) - Similar to above except decrease in silt content to about 20%, damp, increase in moisture with depth.
				64-68		
		▽		69-70		Saturated at 69 feet; sandstone seam from 69-70 feet. Silty Sand (SM) - Similar to above, saturated.
				71-80		
				81-86		Silty Sand (SM) - Similar to above with sandstone seams moderately cemented.
				87-90		Odor at 87 feet. Silty Sand (SM) - Similar to above.
				91-98		
				99		Sandy Gravel (GW) - 20-30% sand, medium grained, subangular gravel angular- subrounded,



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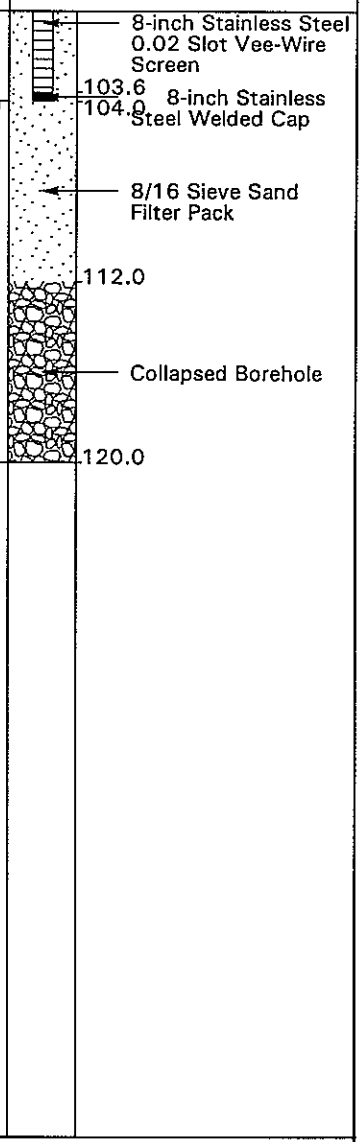
WELL CONSTRUCTION LOG

WELL NO. RIW-201

Client: FINA OIL AND CHEMICAL COMPANY		Start Date: 10-16-96	End Date: 11-2-96	Page 3 of 3
Site: BIG SPRING, TEXAS		Drilling Method: AIR/MUD ROTARY		Project Number: 50-01858.16
Geologist: TRACY PAYNE	Driller: CHOATE WELL SERVICE	Drill Rig Type: GARDNER-DENVER 1500		Borehole Diameter: 12.25 Inches
Site Coordinates, UTM in ft.: N: 239620.4500 E: 793220.2200	Total Depth (ft-bgl): 120.00	Surface Elevation(ft) 2444.60	TOC Elevation(ft) 2447.24	PAD Elevation(ft) 2445.11
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (feet)	Saturation	OVM (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				101–104		granule to pebble well graded, chert, sandstone, limestone, shell fragments, odor.
				104–112		Sandy Gravel (GW) - 20-30% sand, medium grained, subangular gravel angular- subrounded, granule to pebble well graded, chert, sandtone, limestone, shell fragments, odor.
				112–120		Clay (CH) - High plasticity, stiff, dry, red, Dockum Formation.
				120		Clay (CH) - Similar to above.
				121–149		BORING TERMINATED AT 120 FEET BELOW GRADE



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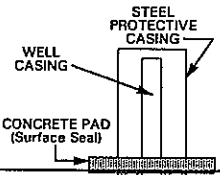
WELL CONSTRUCTION LOG

WELL NO. RIW-202

Client: FINA OIL AND CHEMICAL COMPANY		Start Date: 10-16-96	End Date: 11-4-96	Page 1 of 3
Site: BIG SPRING, TEXAS		Drilling Method: AIR/MUD ROTARY		Project Number: 50-01858.16
Geologist: TRACY PAYNE	Driller: CHOATE WELL SERVICE	Drill Rig Type: GARDNER-DENVER 1500		Borehole Diameter: 12.25 Inches
Site Coordinates, UTM in ft.: N: 239498.8000 E: 792719.1400	Total Depth (ft-bgl): 100.00	Surface Elevation(ft) 2432.00	TOC Elevation(ft) 2434.77	PAD Elevation(ft) 2432.81
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (feet)	Saturation	OVM (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				1–39		Silty Sand (SM) - Very fine grained, 40% silt, light pinkish tan, dry, compact, with sandstone nodules-well cemented.
						Silty Sand (SM) - Similar to above.
						Sandstone seam at 16 feet, well cemented <1 foot thick, sand less compact below seam.
						Silty Sand (SM) - Similar to above except reddish tan.
						Silty sand (SM) - Similar to above except darker reddish tan.



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F-204A Austin (8-95)

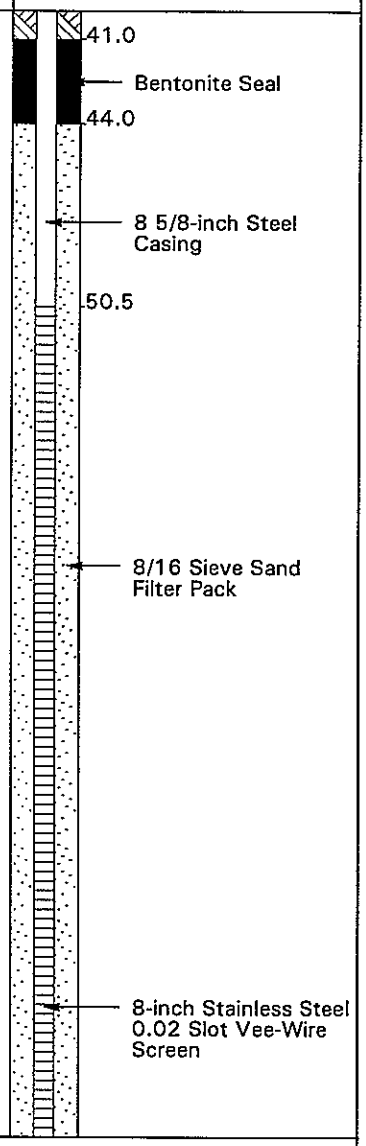
Continued Next Page

WELL CONSTRUCTION LOG

WELL NO. RIW-202

Client: FINA OIL AND CHEMICAL COMPANY		Start Date: 10-16-96	End Date: 11-4-96	Page 2 of 3
Site: BIG SPRING, TEXAS		Drilling Method: AIR/MUD ROTARY		Project Number: 50-01858.16
Geologist: TRACY PAYNE	Driller: CHOATE WELL SERVICE	Drill Rig Type: GARDNER-DENVER 1500		Borehole Diameter: 12.25 Inches
Site Coordinates, UTM in ft.: N: 239498.8000 E: 792719.1400	Total Depth (ft-bgl): 100.00	Surface Elevation(ft) 2432.00	TOC Elevation(ft) 2434.77	PAD Elevation(ft) 2432.81
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (feet)	Saturation	OVM (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				41–79		Silty Sand (SM) - Very fined grained, silt content decreases to 15-20%, dark reddish tan, compact with sandstone nodules-well cemented, damp at base.
						Silty Sand (SM) - Similar as above.
						Moist at 55 feet.
						Saturation at 57 feet
						Silty Sand (SM) - Similar to above, saturated.
						Silty Sand (SM) - Similar to above, odor at 70 feet.
						Sandstone seam at 72 feet, moderately to well cemented.



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F-204A Austin (8-95)

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WELL CONSTRUCTION LOG

WELL NO. RIW-202

Client: FINA OIL AND CHEMICAL COMPANY		Start Date: 10-16-96 / End Date: 11-4-96	Page 3 of 3
Site: BIG SPRING, TEXAS		Drilling Method: AIR/MUD ROTARY	Project Number: 50-01858.16
Geologist: TRACY PAYNE	Driller: CHOATE WELL SERVICE	Drill Rig Type: GARDNER-DENVER 1500	Borehole Diameter: 12.25 Inches
Site Coordinates, UTM in ft.: N: 239498.8000 E: 792719.1400	Total Depth (ft-bgl): 100.00	Surface Elevation(ft): 2432.00 / TOC Elevation(ft): 2434.77	PAD Elevation(ft): 2432.81
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft): / Date:	Time:

Depth (feet)	LITHOLOGIC DESCRIPTION
81–87	Silty Sand (SM) - Very fined grained, silt content decreases to 15-20% dark reddish tan, compact with sandstone nodules-well cemented, saturated.
86–87	Clay (CL) - Low plasticity, soft, saturated, red, "False Red Bed".
87–91	Sandy Gravel (GW) - 40% sand- medium grained, subangular, loose, red; gravel- granule to pebbles, well graded, limestone, chert, quartz, shell fragments, angular to subrounded- saturated.
91–100	Clay (CH) - High plasticity, stiff, dry, red, Dockum Formation.
100	BORING TERMINATED AT 100 FEET BELOW GRADE

8-inch Stainless Steel 0.02 Slot Vee-Wire Screen

8/16 Sieve Sand Filter Pack

90.6

91.0 8-inch Stainless Steel Welded Cap

96.0

Collapsed Borehole

100.0

WELL 01858 1/7/97

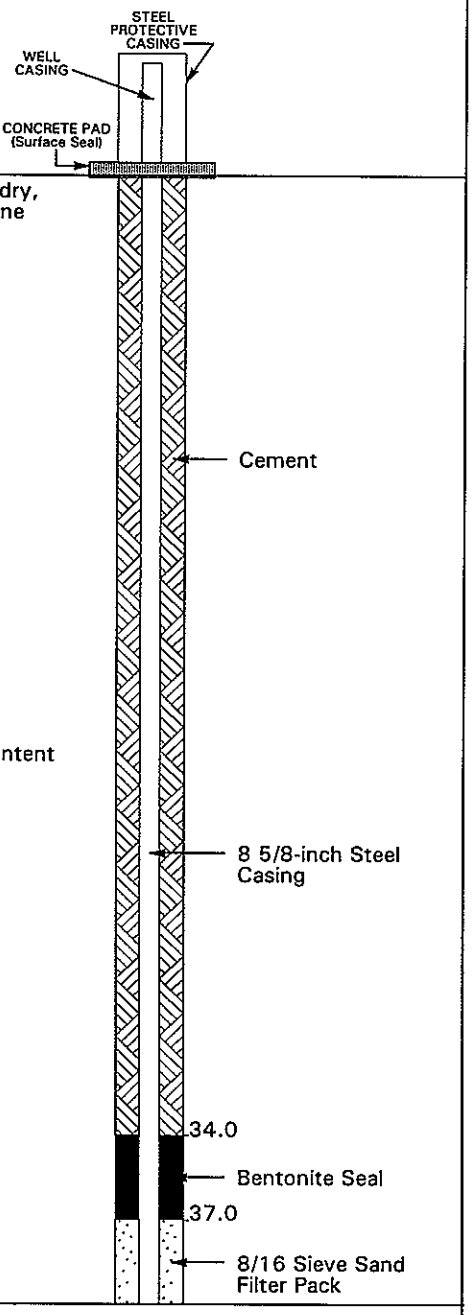
F-204A Austin (8-95)

WELL CONSTRUCTION LOG

WELL NO. RIW-203

Client: FINA OIL AND CHEMICAL COMPANY		Start Date: 10-17-96	End Date: 11-5-96	Page 1 of 3
Site: BIG SPRING, TEXAS		Drilling Method: AIR/MUD ROTARY		Project Number: 50-01858.16
Geologist: TRACY PAYNE	Driller: CHOATE WELL SERVICE	Drill Rig Type: GARDNER-DENVER 1500		Borehole Diameter: 12.25 Inches
Site Coordinates, UTM in ft.: N: 239969.8000 E: 792597.6500	Total Depth (ft-bgl): 100.00	Surface Elevation(ft) 2432.80	TOC Elevation(ft) 2436.06	PAD Elevation(ft) 2433.70
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (feet)	Saturation	OVM (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				1–39		Silty Sand (SM) - Very fine grained, loose, 20% silt, dry, reddish brown, occasional sandstone nodules, poorly cemented.
						Silty Sand (SM) - Similar to above.
						Silty Sand (SM) - Similar to above, decrease in silt content to about 10%
						Silty Sand (SM) - Similar to above.



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F-204A Austin (8-95)

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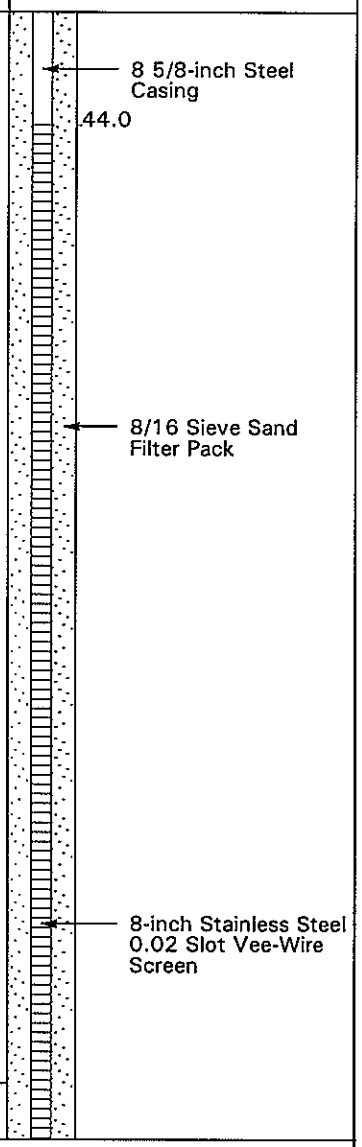
WELL CONSTRUCTION LOG

WELL NO. RIW-203

Client: FINA OIL AND CHEMICAL COMPANY		Start Date: 10-17-96	End Date: 11-5-96	Page 2 of 3
Site: BIG SPRING, TEXAS		Drilling Method: AIR/MUD ROTARY		Project Number: 50-01858.16
Geologist: TRACY PAYNE	Driller: CHOATE WELL SERVICE	Drill Rig Type: GARDNER-DENVER 1500		Borehole Diameter: 12.25 Inches
Site Coordinates, UTM in ft.: N: 239969.8000 E: 792597.6500	Total Depth (ft-bgl): 100.00	Surface Elevation(ft) 2432.80	TOC Elevation(ft) 2436.06	PAD Elevation(ft) 2433.70
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (feet)	Saturation	OVM (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				41–79		Silty Sand (SM) - Very fined grained, loose, 10% silt, dry, reddish brown, occasional sandstone nodules, poorly cemented.
						Silty Sand (SM) - Similar to above, damp at 50 feet.
		▽				Saturation at 52 feet, odor
						Silty Sand (SM) - Similar to above with occasional sandstone nodules.
						Silty Sand (SM) - Similar to above.
						Sandy Clay (CL) - Low plasticity, very hard, saturated, dark reddish brown.



WELL 01858 1/7/97

F-204A Austin (8-95)

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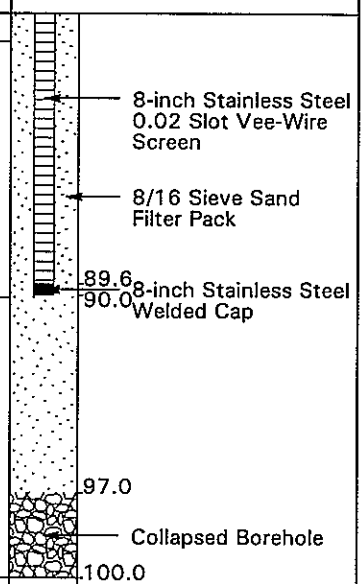
WELL CONSTRUCTION LOG

WELL NO. RIW-203

Client: FINA OIL AND CHEMICAL COMPANY		Start Date: 10-17-96	End Date: 11-5-96	Page 3 of 3
Site: BIG SPRING, TEXAS		Drilling Method: AIR/MUD ROTARY		Project Number: 50-01858.16
Geologist: TRACY PAYNE	Driller: CHOATE WELL SERVICE	Drill Rig Type: GARDNER-DENVER 1500		Borehole Diameter: 12.25 Inches
Site Coordinates, UTM in ft.: N: 239969.8000 E: 792597.6500	Total Depth (ft-bgl): 100.00	Surface Elevation(ft) 2432.80	TOC Elevation(ft) 2436.06	PAD Elevation(ft) 2433.70
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (feet)	Saturation	OVM (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				81–89		Sandy Gravel (GW) - 30-40% medium to coarse grained subangular sand; gravel- subangular to subrounded, granule to large pebbles increasing in size with depth, well graded, chert, shell fragments, limestone, quartz, odor.
				90–100		Clay (CH) - Moderate to high plasticity, stiff, dry, red, Dockum Formation.
				101–119		BORING TERMINATED AT 100 FEET BELOW GRADE



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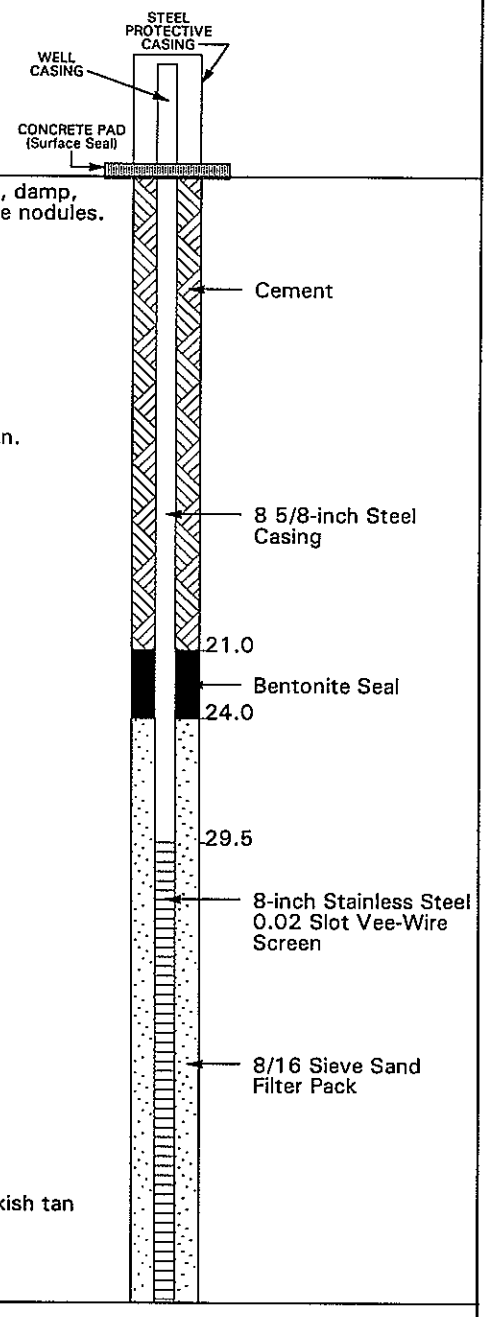
F-204A Austin (8-95)

WELL CONSTRUCTION LOG

WELL NO. RIW-204

Client: FINA OIL AND CHEMICAL COMPANY		Start Date: 10-17-96	End Date: 11-6-96	Page 1 of 2
Site: BIG SPRING, TEXAS		Drilling Method: AIR/MUD ROTARY		Project Number: 50-01858.16
Geologist: TRACY PAYNE	Driller: CHOATE WELL SERVICE	Drill Rig Type: GARDNER-DENVER 1500		Borehole Diameter: 12.25 Inches
Site Coordinates, UTM in ft.: N: 239378.6000 E: 792258.2500	Total Depth (ft-bgl): 80.00	Surface Elevation(ft) 2412.30	TOC Elevation(ft) 2415.22	PAD Elevation(ft) 2412.78
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (feet)	Saturation	OVM (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				1–49		Silty Sand (SM) - Very fine grained, 40% silt, loose, damp, brown, with occasional sandstone nodules.
						Silty Sand (SM) - Similar to above. Sandstone seam at 11 feet; < 1 foot thick, tan.
						Silty Sand (SM) - Similar to above.
						Silty Sand (SM) - Similar to above, odor, occasional sandstone nodules, moderately cemented-gray.
		▽				Damp at 35 feet Saturated at 36 feet
						Silty Sand (SM) - Similar to above.
						Sandstone seam at 45-46 feet, well cemented, pinkish tan to light brown.



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F-204A Austin (8-95)

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WELL CONSTRUCTION LOG

WELL NO. RIW-204

Client: FINA OIL AND CHEMICAL COMPANY	Start Date: 10-17-96	End Date: 11-6-96	Page 2 of 2
Site: BIG SPRING, TEXAS	Drilling Method: AIR/MUD ROTARY		Project Number: 50-01858.16
Geologist: TRACY PAYNE	Driller: CHOATE WELL SERVICE	Drill Rig Type: GARDNER-DENVER 1500	Borehole Diameter: 12.25 Inches
Site Coordinates, UTM in ft.: N: 239378.6000 E: 792258.2500	Total Depth (ft-bgl): 80.00	Surface Elevation(ft) 2412.30	TOC Elevation(ft) 2415.22 / PAD Elevation(ft) 2412.78
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date: / Time:

Sample Type	Recovery (feet)	Saturation	OVM (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				51–65		Silty Sand (SM) - Very fine grained, 40% silt, saturated, pinkish tan to light brown, sandstone seams throughout well cemented.
				65–70		Silty Sand (SM) - Similar to above.
				66–70		Sandy Gravel (GW) - 25% coarse grained, subangular sand with gravel- well graded, granule to large pebbles, subangular to subrounded, shell fragments, chert, quartz, limestone, odor.
				70–80		Clay (CH) - High plasticity, stiff, dry, red, Dockum Formation.
				80–99		BORING TERMINATED AT 80 FEET BELOW GRADE

8/16 Sieve Sand Filter Pack

8-inch Stainless Steel 0.02 Slot Vee-Wire Screen

69.6

70.0 8-inch Stainless Steel Welded Cap

75.0

Collapsed Borehole

80.0

WELL 01858 1/7/97

F-204A Austin (8-95)

WELL CONSTRUCTION LOG

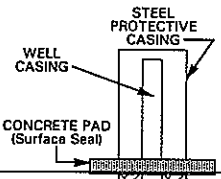
PLUGGED & ABANDONED - replaced with identical well RIW-205R

WELL NO. RIW-205

Client: FINA OIL AND CHEMICAL COMPANY	Start Date: 10-18-96	End Date: 11-7-96	Page 1 of 2
Site: BIG SPRING, TEXAS	Drilling Method: AIR/MUD ROTARY		Project Number: 50-01858.16
Geologist: TRACY PAYNE	Driller: CHOATE WELL SERVICE	Drill Rig Type: GARDNER-DENVER 1500	Borehole Diameter: 12.25 Inches
Site Coordinates, UTM in ft.: N: 239849.9000 E: 792100.8100	Total Depth (ft-bgl): 80.00	Surface Elevation(ft) 2411.10 / TOC Elevation(ft) 2412.05	PAD Elevation(ft) 2411.46
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft): / Date:	Time:

Sample Type | Recovery (feet) | Saturation | OVM (ppm) | Depth (feet) | Stratigraphy

LITHOLOGIC DESCRIPTION



Silty Sand (SM) - Very fine grained, 40% silt, compact, damp, brown.

Silty Sand (SM) - Similar to above, dry.

Tan at 15 feet.

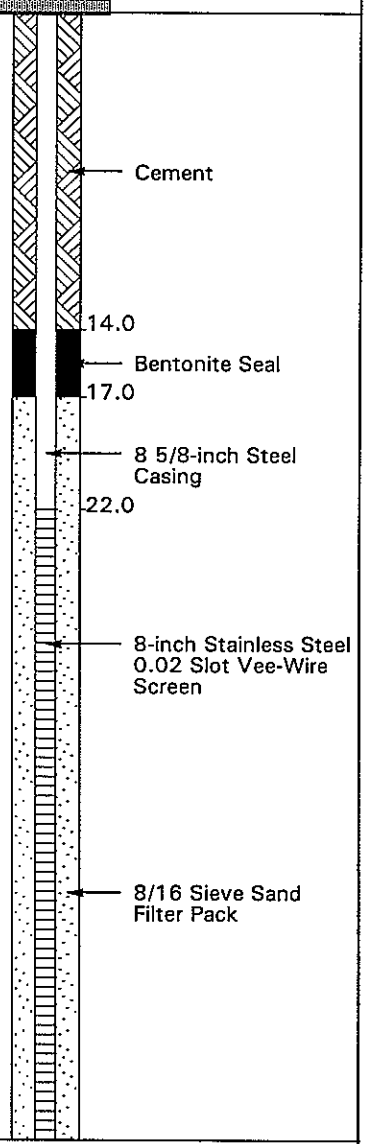
Silty Sand (SM) - Similar to above except reddish brown.

Odor at 26 feet, damp.

Saturation at 29 feet

Silty Sand (SM) - Similar to above, strong odor at 30 feet; odor becomes stronger with depth.

Silty Sand (SM) - Similar to above, occasional sandstone nodules, moderate to well cemented, strong odor.



WELL 01858 1/7/97

F-204A Austin (8-95)

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WELL CONSTRUCTION LOG

PLUGGED & ABANDONED - replaced with identical well RIW-205R

WELL NO. RIW-205

Client: FINA OIL AND CHEMICAL COMPANY	Start Date: 10-18-96	End Date: 11-7-96	Page 2 of 2
Site: BIG SPRING, TEXAS	Drilling Method: AIR/MUD ROTARY		Project Number: 50-01858.16
Geologist: TRACY PAYNE	Driller: CHOATE WELL SERVICE	Drill Rig Type: GARDNER-DENVER 1500	Borehole Diameter: 12.25 Inches
Site Coordinates, UTM in ft.: N: 239849.9000 E: 792100.8100	Total Depth (ft-bgl): 80.00	Surface Elevation(ft) 2411.10 / TOC Elevation(ft) 2412.05	PAD Elevation(ft) 2411.46
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft): / Date:	Time:

Sample Type | Recovery (feet) | Saturation | OVM (ppm) | Depth (feet) | Stratigraphy

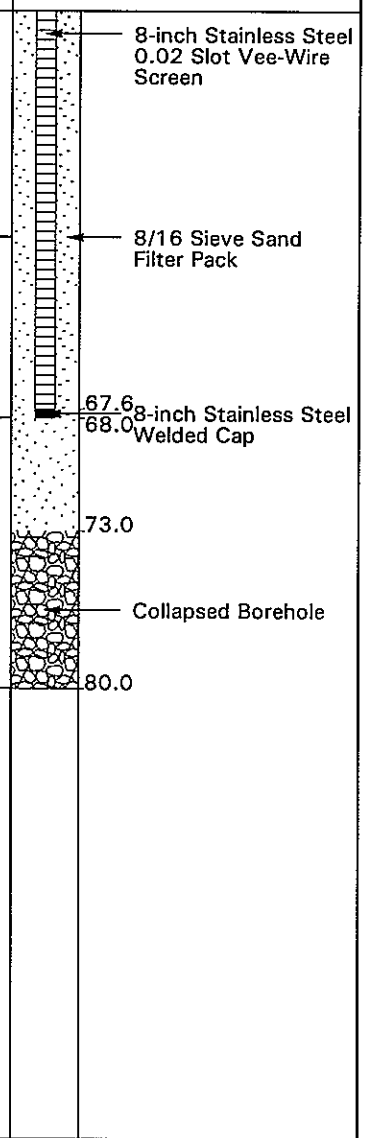
LITHOLOGIC DESCRIPTION

Silty Sand (SM) - Very fine grained, 40% silt, compact, saturated, brown, occasional sandstone nodules, moderate to well cemented, strong odor.

Sandy Gravel (GW) - Medium to coarse grained sand, angular to subangular, gravel- well graded, angular to subrounded, granule to large pebbles, chert, quartz, limestone, shell fragments, saturation, odor.

Clay (CH) - Moderate to high plasticity, firm, dry, red, Dockum Formation.

BORING TERMINATED AT 80 FEET BELOW GRADE



WELL 01858 1/7/97

F-204A Austin (8-95)

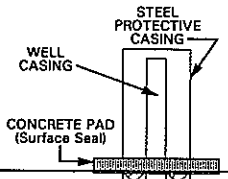
WELL CONSTRUCTION LOG

WELL NO. RIW-206

Client: FINA OIL AND CHEMICAL COMPANY		Start Date: 10-18-96	End Date: 10-18-96	Page 1 of 2
Site: BIG SPRING, TEXAS		Drilling Method: AIR/MUD ROTARY		Project Number: 50-01858.16
Geologist: TRACY PAYNE	Driller: CHOATE WELL SERVICE	Drill Rig Type: GARDNER-DENVER 1500		Borehole Diameter: 12.25 Inches
Site Coordinates, UTM in ft.: N: 239770.0300 E: 791600.2100	Total Depth (ft-bgl): 95.00	Surface Elevation(ft) 2419.10	TOC Elevation(ft) 2421.96	PAD Elevation(ft) 2419.65
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type | Recovery (feet) | Saturation | OVM (ppm) | Depth (feet) | Stratigraphy

LITHOLOGIC DESCRIPTION



Silty Sand (SM) - Very fined grained, 20-30% silt, compact, dry, brown grading to reddish tan.

Silty Sand (SM) - Similar to above.

Silty Sand (SM) - Similar to above.

Silty Sand (SM) - Similar to above, damp.

Odor at 32 feet, odor increases with depth.

Saturation at 39 feet, free phase hydrocarbon.

Silty Sand(SM) - Similar to above with sandstone seams throughout, odor, saturated.

Cement

8 5/8-inch Steel Casing

22.0

Bentonite Seal

27.0

33.0

8-inch Stainless Steel 0.02 Slot Vee-Wire Screen

8/16 Sieve Sand Filter Pack

WELL 01858 1/7/97

F-204A Austin (8-95)

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WELL CONSTRUCTION LOG

WELL NO. RIW-206

Client: FINA OIL AND CHEMICAL COMPANY		Start Date: 10-18-96	End Date: 10-18-96	Page 2 of 2
Site: BIG SPRING, TEXAS		Drilling Method: AIR/MUD ROTARY		Project Number: 50-01858.16
Geologist: TRACY PAYNE	Driller: CHOATE WELL SERVICE	Drill Rig Type: GARDNER-DENVER 1500		Borehole Diameter: 12.25 Inches
Site Coordinates, UTM in ft.: N: 239770.0300 E: 791600.2100	Total Depth (ft-bgl): 95.00	Surface Elevation(ft) 2419.10	TOC Elevation(ft) 2421.96	PAD Elevation(ft) 2419.65
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Depth (feet)	LITHOLOGIC DESCRIPTION
51–57	Silty Sand (SM) - Very fine grained, 20-30% silt, compact, reddish tan, with sandstone seams throughout, odor, saturated.
60–71	Silty Sand (SM) - Similar to above.
73–75	Clay (CL) - Low plasticity, soft, saturated, red, "False Red Bed".
76–79	Sandy Gravel (GW) - 30% sand, subangular, fine to medium grained, loose, gravel- angular to subrounded, granule to pebble, quartz, shell fragments, limestone, well graded, larger pebbles at base.
80–95	Clay (CH) - High plasticity, stiff, dry, dark red, Dockum Formation.
95	BORING TERMINATED AT 95 FEET BELOW GRADE

8/16 Sieve Sand Filter Pack

8-inch Stainless Steel 0.02 Slot Vee-Wire Screen

78.6

79.0 8-inch Stainless Steel Welded Cap

86.0

Collapsed Borehole

95.0

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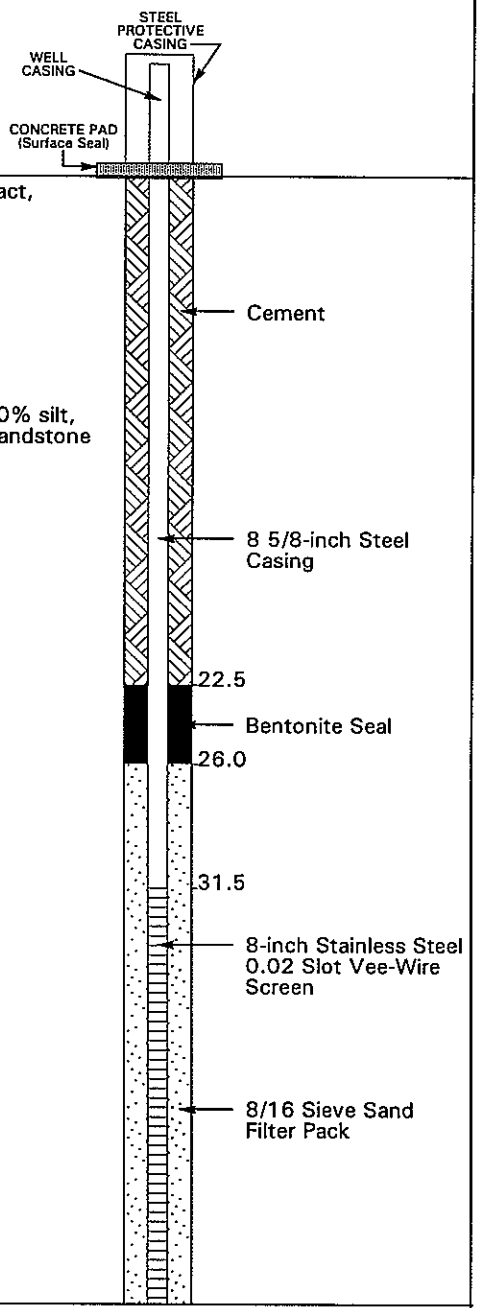
F-204A Austin (8-95)

WELL CONSTRUCTION LOG

WELL NO. RIW-207

Client:		Start Date:	End Date:	Page of
FINA OIL AND CHEMICAL COMPANY		10-21-96	11-11-96	1 2
Site:		Drilling Method:		Project Number:
BIG SPRING, TEXAS		AIR/MUD ROTARY		50-01858.16
Geologist:	Driller:	Drill Rig Type:		Borehole Diameter:
TRACY PAYNE	CHOATE WELL SERVICE	GARDNER-DENVER 1500		12.25 Inches
Site Coordinates, UTM in ft.:	Total Depth (ft-bgl):	Surface Elevation(ft)	TOC Elevation(ft)	PAD Elevation(ft)
N: 239719.5800 E: 791350.1200	80.00	2416.60	2419.57	2416.98
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (feet)	Saturation	OVM (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				1-49		Silty Sand (SM) - Very fine grained, 30% silt, compact, damp, dark brown.
						Silty Sand (SM) - Similar to above, poorly graded, 20% silt, dry, reddish tan with occasional sandstone nodules.
						Silty Sand (SM) - Similar to above.
						Silty Sand (SM) - Similar to above, damp. Odor at 31 feet.
						Very strong odor at 35 feet.
						Saturated at 39 feet Silty Sand (SM) - Similar to above.



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WELL CONSTRUCTION LOG

WELL NO. RIW-207

Client: FINA OIL AND CHEMICAL COMPANY	Start Date: 10-21-96	End Date: 11-11-96	Page 2 of 2
Site: BIG SPRING, TEXAS	Drilling Method: AIR/MUD ROTARY		Project Number: 50-01858.16
Geologist: TRACY PAYNE	Driller: CHOATE WELL SERVICE	Drill Rig Type: GARDNER-DENVER 1500	Borehole Diameter: 12.25 Inches
Site Coordinates, UTM in ft.: N: 239719.5800 E: 791350.1200	Total Depth (ft-bgl): 80.00	Surface Elevation(ft) 2416.60	TOC Elevation(ft) 2419.57 / PAD Elevation(ft) 2416.98
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date: / Time:

Sample Type | Recovery (feet) | Saturation | OVM (ppm) | Depth (feet) | Stratigraphy

LITHOLOGIC DESCRIPTION

Silty Sand (SM) - Poorly graded sand, 20% silt, saturated, reddish tan with occasional sandstone nodules.
Sandstone seam at 52 feet

Strong odor at 55 feet.

Sandy Clay (CL) - 40% sand, low plasticity, very stiff, saturated, red, "False Red Bed".

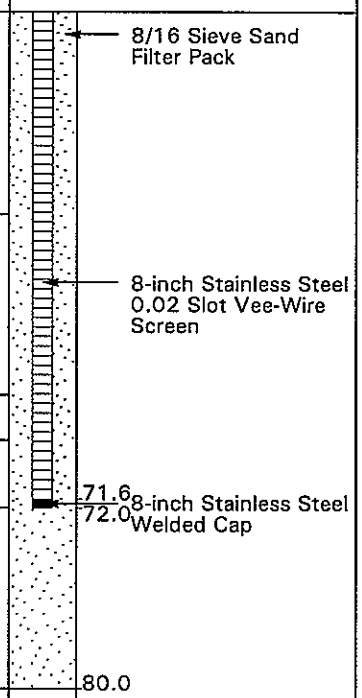
Sandy Clay (CL) - 20% sand, moderate to high plasticity, soft to very soft, red, saturated.

Sand (SP) - Fine grained, angular, loose, saturated, reddish tan, odor.

Sandy Gravel (GW) - 40% angular fine grained sand; gravel-well graded, subangular to subrounded, granule to pebble, saturated, chert, quartz, limestone, shell fragments, odor.

Clay (CH) - High plasticity, stiff, dry, red, Dockum Formation.

BORING TERMINATED AT 80 FEET BELOW GRADE



WELL 01858 1/7/97

F-204A Austin (8-95)

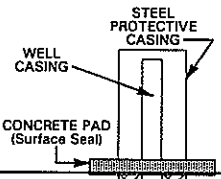
WELL CONSTRUCTION LOG

WELL NO. RIW-208

Client:		Start Date:	End Date:	Page of
FINA OIL AND CHEMICAL COMPANY		10-21-96	11-12-96	1 2
Site:		Drilling Method:		Project Number:
BIG SPRING, TEXAS		AIR/MUD ROTARY		50-01858.16
Geologist:	Driller:	Drill Rig Type:		Borehole Diameter:
TRACY PAYNE	CHOATE WELL SERVICE	GARDNER-DENVER 1500		12.25 Inches
Site Coordinates, UTM in ft.:	Total Depth (ft-bgl):	Surface Elevation(ft)	TOC Elevation(ft)	PAD Elevation(ft)
N: 239674.9900 E: 791103.5200	80.00	2412.50	2415.74	2413.17
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type | Recovery (feet) | Saturation | OVM (ppm) | Depth (feet) | Stratigraphy

LITHOLOGIC DESCRIPTION



Silty Sand (SM) - Very fine grained; 30-40% silt, loose, dry, pinkish tan.

Silty Sand (SM) - Similar to above.

Silty Sand (SM) - Similar to above, reddish tan.

Silty Sand(SM) - Similar to above except damp to moist.

Saturated at 33 feet

Strong odor at 35 feet

Silty Sand (SM) - Similar to above.

Cement

14.5

Bentonite Seal

18.0

8 5/8-inch Steel Casing

23.0

8-inch Stainless Steel 0.02 Slot Vee-Wire Screen

8/16 Sieve Sand Filter Pack

WELL 01858 1/7/97

F-204A Austin (8-95)

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WELL CONSTRUCTION LOG

WELL NO. RIW-208

Client: FINA OIL AND CHEMICAL COMPANY		Start Date: 10-21-96	End Date: 11-12-96	Page 2 of 2
Site: BIG SPRING, TEXAS		Drilling Method: AIR/MUD ROTARY		Project Number: 50-01858.16
Geologist: TRACY PAYNE	Driller: CHOATE WELL SERVICE	Drill Rig Type: GARDNER-DENVER 1500		Borehole Diameter: 12.25 Inches
Site Coordinates, UTM in ft.: N: 239674.9900 E: 791103.5200	Total Depth (ft-bgl): 80.00	Surface Elevation(ft) 2412.50	TOC Elevation(ft) 2415.74	PAD Elevation(ft) 2413.17
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Depth (feet)	LITHOLOGIC DESCRIPTION
51–52	Silty Sand (SM) - Very fine grained, 30-40% silt, loose, saturated, reddish tan.
52–56	Sandy Clay (CL) - 30-40% sand, very stiff to firm, red, saturated, low plasticity, "False Red Bed".
56–65	Sandy Clay (CL) - 20% sand, moderate plasticity, soft to very soft, red, saturated.
57–65	Sandy Clay (CL) - Similar to above with gypsum flakes at base.
65–69	Sandy Gravel (GW) - 40% medium grained, subangular sand; Gravel- granule to pebble, well graded, loose, saturated, subangular to subrounded, quartz, limestone, shell fragments.
69–80	Clay (CH) - Stiff, high plasticity, dry, red, Dockum Formation.
80	BORING TERMINATED AT 80 FEET BELOW GRADE

8/16 Sieve Sand Filter Pack

8-inch Stainless Steel 0.02 Slot Vee-Wire Screen

68.6

69.0 8-inch Stainless Steel Welded Cap

75.0

Collapsed Borehole

80.0

WELL 01858 1/7/97

F-204A Austin (8-95)

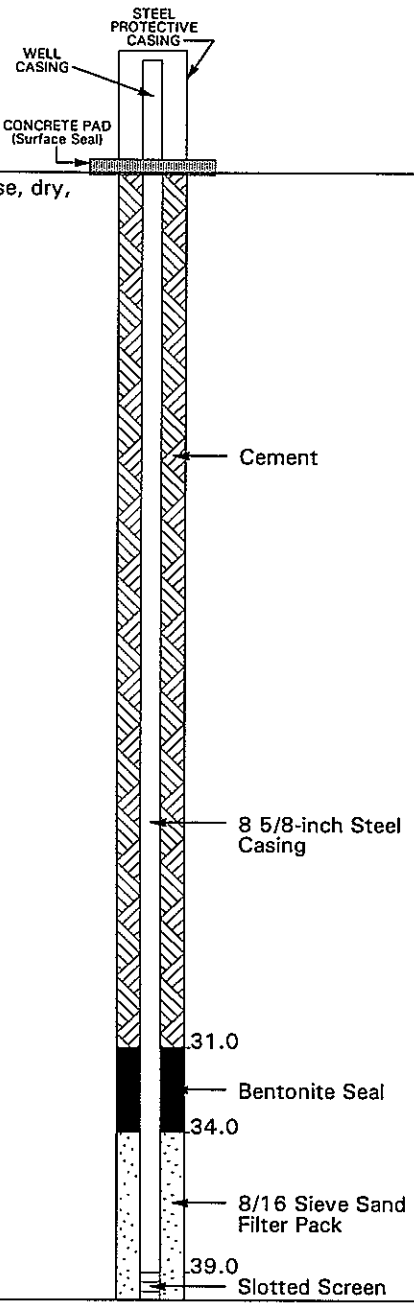
WELL CONSTRUCTION LOG

RMT INC.

WELL NO. RIW-209

Client: FINA OIL AND CHEMICAL COMPANY		Start Date: 10-21-96	End Date: 11-13-96	Page 1 of 3
Site: BIG SPRING, TEXAS		Drilling Method: AIR/MUD ROTARY		Project Number: 50-01858.16
Geologist: TRACY PAYNE	Driller: CHOATE WELL SERVICE	Drill Rig Type: GARDNER-DENVER 1500		Borehole Diameter: 12.25 Inches
Site Coordinates, UTM in ft.: N: 239550.1600 E: 790603.7700	Total Depth (ft-bgl): 100.00	Surface Elevation(ft) 2425.30	TOC Elevation(ft) 2428.66	PAD Elevation(ft) 2426.48
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (feet)	Saturation	OVM (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				1–39		Silty Sand (SM) - 20-30% silt, very fine grained, loose, dry, pinkish tan.
						Silty Sand (SM) - Similar to above.
						Silty Sand (SM) - Similar to above, light reddish tan.
						Silty Sand (SM) - Similar to above, 10-20% silt.
						Faint odor at 38 feet.



WELL 01858 1/7/97

F-204A Austin (8-95)

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WELL CONSTRUCTION LOG

WELL NO. RIW-209

Client: FINA OIL AND CHEMICAL COMPANY		Start Date: 10-21-96	End Date: 11-13-96	Page 2 of 3
Site: BIG SPRING, TEXAS		Drilling Method: AIR/MUD ROTARY		Project Number: 50-01858.16
Geologist: TRACY PAYNE	Driller: CHOATE WELL SERVICE	Drill Rig Type: GARDNER-DENVER 1500		Borehole Diameter: 12.25 Inches
Site Coordinates, UTM in ft.: N: 239550.1600 E: 790603.7700	Total Depth (ft-bgl): 100.00	Surface Elevation(ft) 2425.30	TOC Elevation(ft) 2428.66	PAD Elevation(ft) 2426.48
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (feet)	Saturation	OVM (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				41–79		Silty Sand (SM) - Very fine grained, 10-20% silt, loose, dry, light reddish tan.
						Damp at 45 feet.
		▽				Saturated at 48 feet
						Silty Sand (SM) - Similar to above.
						Silty Sand (SM) - Similar to above.
						Sandy Clay (CL) - 30-40% sand, very stiff, low plasticity, saturated, red, "False Red Bed".
						Sandy Clay (CL) - 20% sand, moderate plasticity, soft, saturated, red, "False Red Bed".
						Sandy Gravel (GW) - 20% medium, subangular sand; Gravel-

8/16 Sieve Sand Filter Pack

8-inch Stainless Steel 0.02 Slot Vee-Wire Screen

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F-204A Austin (8-95)

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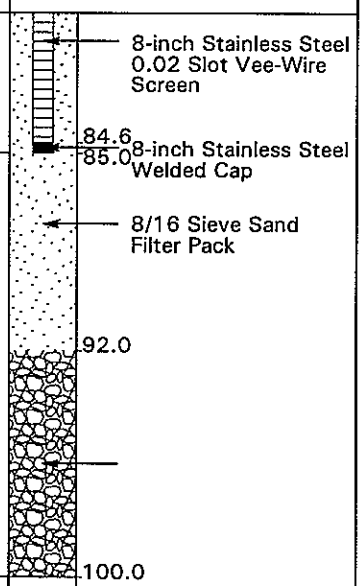
WELL CONSTRUCTION LOG

WELL NO. RIW-209

Client: FINA OIL AND CHEMICAL COMPANY		Start Date: 10-21-96	End Date: 11-13-96	Page 3 of 3
Site: BIG SPRING, TEXAS		Drilling Method: AIR/MUD ROTARY		Project Number: 50-01858.16
Geologist: TRACY PAYNE	Driller: CHOATE WELL SERVICE	Drill Rig Type: GARDNER-DENVER 1500		Borehole Diameter: 12.25 Inches
Site Coordinates, UTM in ft.: N: 239550.1600 E: 790603.7700	Total Depth (ft-bgl): 100.00	Surface Elevation(ft) 2425.30	TOC Elevation(ft) 2428.66	PAD Elevation(ft) 2426.48
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (feet)	Saturation	OVM (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				81–85		granule to large pebbles, well graded, loose, saturated, subangular to subrounded, quartz, shell fragments, limestone, <10% cobbles.
				85–100		Clay (CH) - High plasticity, stiff, dry, red, Dockum Formation.
				100		BORING TERMINATED AT 100 FEET BELOW GRADE



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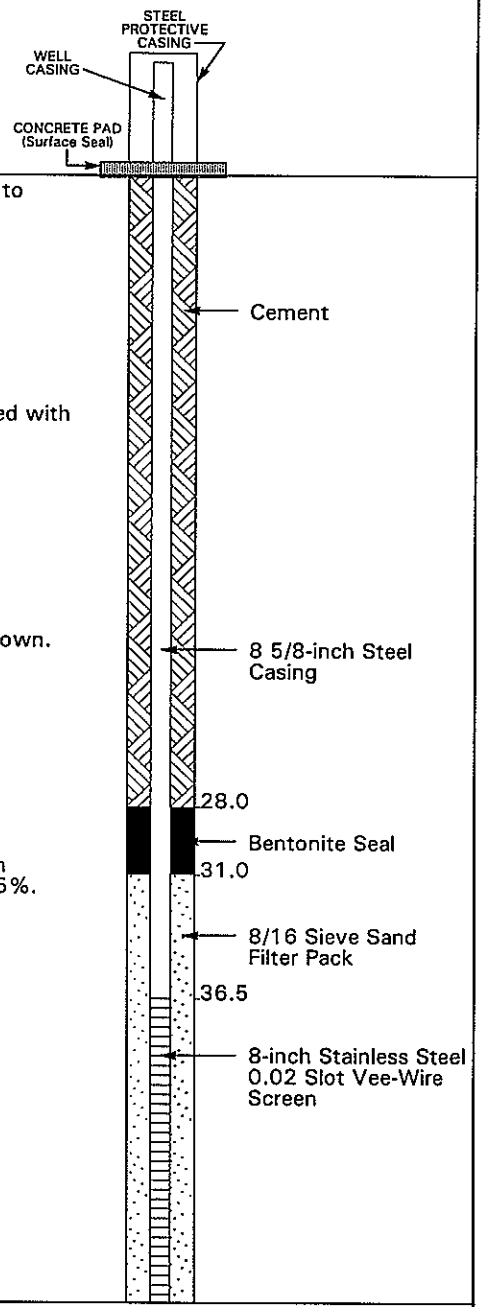
F-204A Austin (8-95)

WELL CONSTRUCTION LOG

WELL NO. RIW-210

Client: FINA OIL AND CHEMICAL COMPANY		Start Date: 10-22-96	End Date: 10-29-96	Page 1 of 2
Site: BIG SPRING, TEXAS		Drilling Method: AIR/MUD ROTARY		Project Number: 50-01858.16
Geologist: TRACY PAYNE	Driller: CHOATE WELL SERVICE	Drill Rig Type: GARDNER-DENVER 1500		Borehole Diameter: 12.25 Inches
Site Coordinates, UTM in ft.: N: 239200.2800 E: 790997.9600	Total Depth (ft-bgl): 90.00	Surface Elevation(ft) 2420.50	TOC Elevation(ft) 2422.86	PAD Elevation(ft) 2421.01
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (feet)	Saturation	OVM (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				1–49		Silty Sand (SM) - Very fine grained, 40% silt, loose to compact, dry, pinkish tan.
						Silty Sand (SM) - Similar to above except fine grained with 20% silt.
						Silty Sand (SM) - Similar to above except reddish brown.
						Silty Sand (SM) - Similar to above except damp with occasional sandstone nodules < 5%.
		▽				Silty Sand (SM) - Similar to above, except moist.
						Saturated at 44 feet



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F-204A Austin (8-95)

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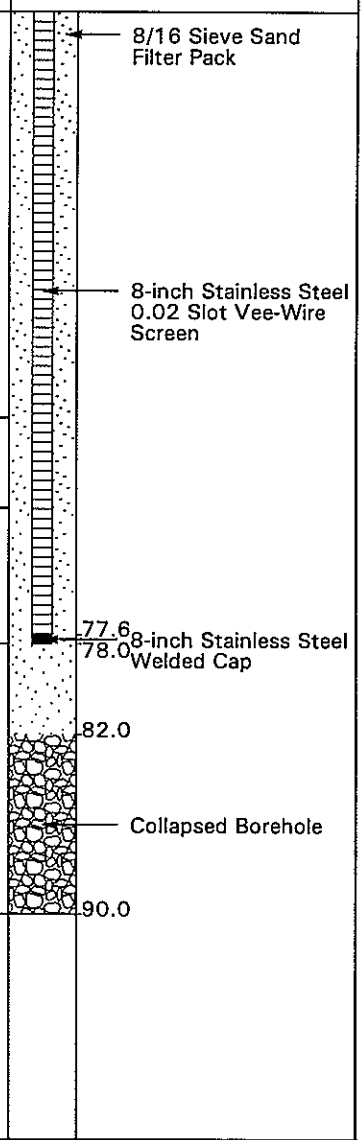
WELL CONSTRUCTION LOG

WELL NO. RIW-210

Client: FINA OIL AND CHEMICAL COMPANY	Start Date: 10-22-96	End Date: 10-29-96	Page 2 of 2
Site: BIG SPRING, TEXAS	Drilling Method: AIR/MUD ROTARY		Project Number: 50-01858.16
Geologist: TRACY PAYNE	Driller: CHOATE WELL SERVICE	Drill Rig Type: GARDNER-DENVER 1500	Borehole Diameter: 12.25 Inches
Site Coordinates, UTM in ft.: N: 239200.2800 E: 790997.9600	Total Depth (ft-bgl): 90.00	Surface Elevation(ft) 2420.50	TOC Elevation(ft) 2422.86 / PAD Elevation(ft) 2421.01
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date: / Time:

Sample Type	Recovery (feet)	Saturation	OVM (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				51–68		Silty Sand(SM) - Very fine grained, 20% silt, loose to compact, saturated, reddish brown. Sandstone seam at 59 feet. Silty Sand (SM) - Similar to above, sandstone seam at 60 feet.
				68–72		Sandy Clay (CL) - Low plasticity, 10-20% sand, soft, saturated, red, "False Red Bed".
				72–78		Sandy Gravel (GW) - 20% fine to medium grained subangular sand; gravel- granule to pebble sized, well graded, angular to subrounded, saturated, limestone, sandstone, quartz, shell fragments.
				78–90		Clay (CH) - High plasticity, stiff, dry, red, Dockum Formation.
				90		BORING TERMINATED AT 90 FEET BELOW GRADE



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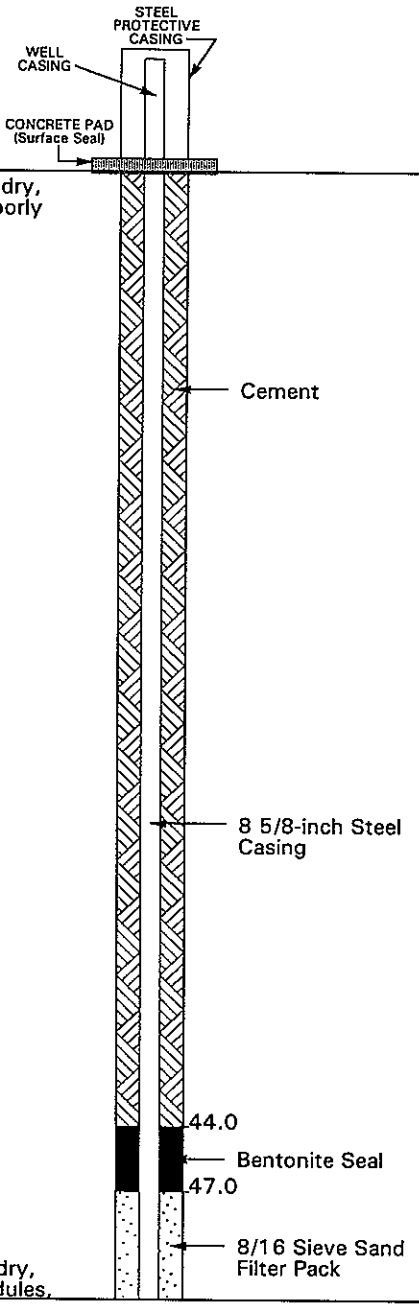
F-204A Austin (8-95)

WELL CONSTRUCTION LOG

WELL NO. RIW-211

Client: FINA OIL AND CHEMICAL COMPANY		Start Date: 10-22-96	End Date: 10-28-96	Page 1 of 3
Site: BIG SPRING, TEXAS		Drilling Method: AIR/MUD ROTARY		Project Number: 50-01858.16
Geologist: TRACY PAYNE	Driller: CHOATE WELL SERVICE	Drill Rig Type: GARDNER-DENVER 1500		Borehole Diameter: 12.25 Inches
Site Coordinates, UTM in ft.: N: 239051.0200 E: 790541.0200	Total Depth (ft-bgl): 120.00	Surface Elevation(ft) 2445.50	TOC Elevation(ft) 2448.11	PAD Elevation(ft) 2446.08
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (feet)	Saturation	OVM (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				1–51		Silty Sand (SM) - Very fine grained, 40% silt, loose, dry, pinkish tan, sandstone nodules, poorly cemented.
						Silty Sand (SM) - Similar to above.
						Silty Sand (SM) - Similar to above.
						Light reddish tan at 25 feet, silt 20%.
						Silty Sand (SM) - Similar to above.
						Silty Sand (SM) - Similar to above.
						Light reddish brown at 45 feet.
						Silty Sand (SM) - Very fine grained, 20% silt, loose, dry, light reddish brown, sandstone nodules,



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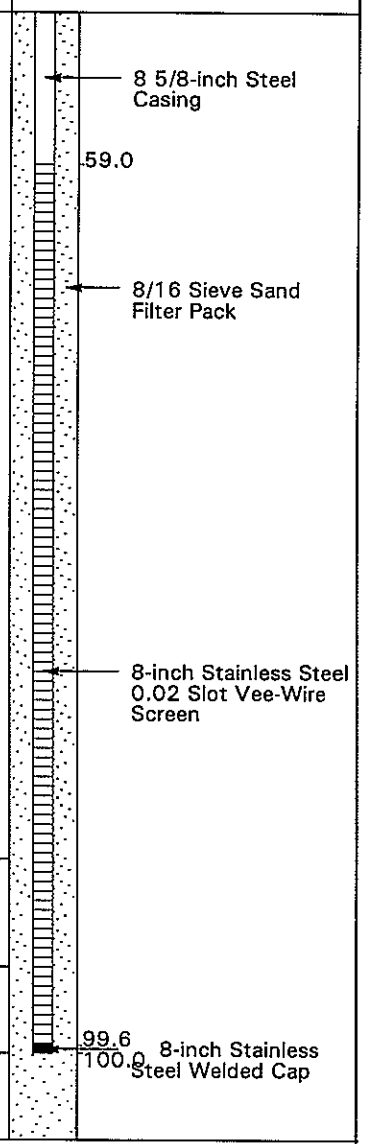
WELL CONSTRUCTION LOG

WELL NO. RIW-211

Client: FINA OIL AND CHEMICAL COMPANY		Start Date: 10-22-96	End Date: 10-28-96	Page 2 of 3
Site: BIG SPRING, TEXAS		Drilling Method: AIR/MUD ROTARY		Project Number: 50-01858.16
Geologist: TRACY PAYNE	Driller: CHOATE WELL SERVICE	Drill Rig Type: GARDNER-DENVER 1500		Borehole Diameter: 12.25 Inches
Site Coordinates, UTM in ft.: N: 239051.0200 E: 790541.0200	Total Depth (ft-bgl): 120.00	Surface Elevation(ft) 2445.50	TOC Elevation(ft) 2448.11	PAD Elevation(ft) 2446.08
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (feet)	Saturation	OVM (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				53–103		poorly cemented. Damp at 55 feet Silty Sand (SM) - Similar to above, except fine grained, damp, reddish brown. Saturation at 69 feet. Silty Sand (SM) - Similar to above. Silty Sand (SM) - Similar to above. Silty Sand (SM) - Similar to above. Sandy Clay (CL) - 20% very fine sand, low plasticity, soft, saturated, red, "False Red Bed". Sandy Gravel (GW) - 20% medium grained, angular sand; Gravel- angular to subrounded, well graded, granule to pebble, shell fragments, quartz, sandstone, limestone, chert, saturated. Clay (CH) - Stiff, high plasticity, dry, red, Dockum Formation.



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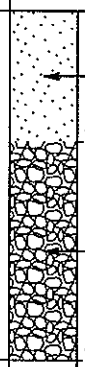
WELL CONSTRUCTION LOG

WELL NO. RIW-211

Client:		Start Date:	End Date:	Page of
FINA OIL AND CHEMICAL COMPANY		10-22-96	10-28-96	3 3
Site:		Drilling Method:		Project Number:
BIG SPRING, TEXAS		AIR/MUD ROTARY		50-01858.16
Geologist:	Driller:	Drill Rig Type:		Borehole Diameter:
TRACY PAYNE	CHOATE WELL SERVICE	GARDNER-DENVER 1500		12.25 Inches
Site Coordinates, UTM in ft.:	Total Depth (ft-bgl):	Surface Elevation(ft)	TOC Elevation(ft)	PAD Elevation(ft)
N: 239051.0200 E: 790541.0200	120.00	2445.50	2448.11	2446.08
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (feet)	Saturation	OVM (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				105–120		CLAY (CH) - Similar to above.
				120		BORING TERMINATED AT 120 FEET BELOW GRADE



8/16 Sieve Sand Filter Pack

110.0

Collapsed Borehole

120.0

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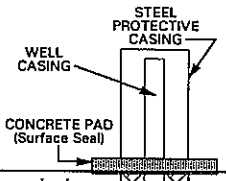
WELL CONSTRUCTION LOG

WELL NO. RIW-212

Client:		Start Date:	End Date:	Page of
FINA OIL AND CHEMICAL COMPANY		10-22-96	10-22-96	1 3
Site:		Drilling Method:		Project Number:
BIG SPRING, TEXAS		AIR/MUD ROTARY		50-01858.16
Geologist:	Driller:	Drill Rig Type:		Borehole Diameter:
TRACY PAYNE	CHOATE WELL SERVICE	GARDNER-DENVER 1500		12.25 Inches
Site Coordinates, UTM in ft.:	Total Depth (ft-bgl):	Surface Elevation(ft)	TOC Elevation(ft)	PAD Elevation(ft)
N: 239440.8800 E: 790109.8500	120.00	2450.90	2453.89	2451.44
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (feet)	Saturation	OVM (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				1–49		Silty Sand (SM) - Fine grained, 40% silt, compact, dry, dark brown.
						Silty Sand (SM) - Very fine grained, 40% silt, dense, dry, pinkish tan, occasional moderately cemented sandstone seams.
						Silty Sand (SM) - Similar to above.
						Silty Sand (SM) - Similar to above, except reddish tan.
						Silty Sand (SM) - Similar to above.
						Silty Sand (SM) - Similar to above.



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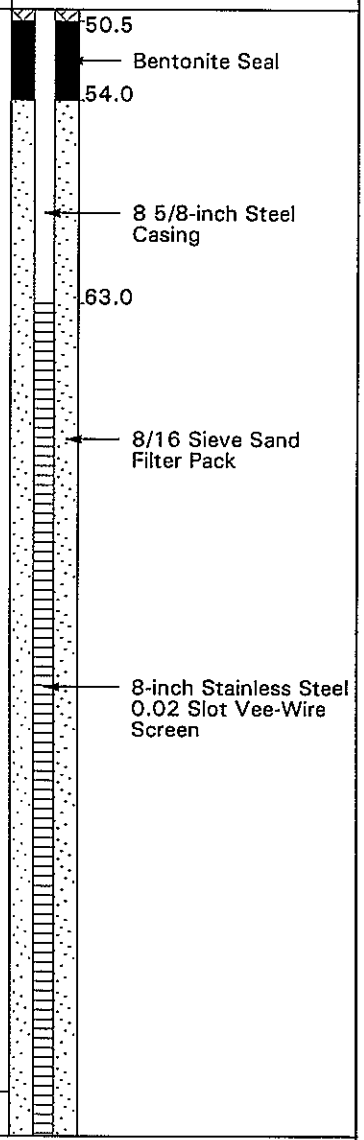
WELL CONSTRUCTION LOG

WELL NO. RIW-212

Client:		Start Date:	End Date:	Page of
FINA OIL AND CHEMICAL COMPANY		10-22-96	10-22-96	2 3
Site:		Drilling Method:		Project Number:
BIG SPRING, TEXAS		AIR/MUD ROTARY		50-01858.16
Geologist:	Driller:	Drill Rig Type:		Borehole Diameter:
TRACY PAYNE	CHOATE WELL SERVICE	GARDNER-DENVER 1500		12.25 Inches
Site Coordinates, UTM in ft.:	Total Depth (ft-bgl):	Surface Elevation(ft)	TOC Elevation(ft)	PAD Elevation(ft)
N: 239440.8800 E: 790109.8500	120.00	2450.90	2453.89	2451.44
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (feet)	Saturation	OVM (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				51–99		Silty Sand (SM) - Very fine grained, 40 % silt, dense, reddish tan, occasional moderately cemented sandstone seams.
						Damp at 55 feet.
						Silty Sand(SM) - Similar to above, except reddish brown, damp.
						Silty Sand (SM) - Similar to above.
						Saturated at 72 feet, strong odor.
						Silty Sand (SM) - Similar to above with strong odor.
						Silty Sand (SM) - Similar to above.
						Sandy Clay (CL) - Low plasticity, very soft, saturated, red.



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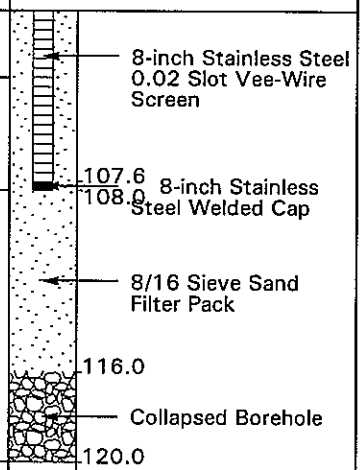
WELL CONSTRUCTION LOG

WELL NO. RIW-212

Client: FINA OIL AND CHEMICAL COMPANY		Start Date: 10-22-96	End Date: 10-22-96	Page 3 of 3
Site: BIG SPRING, TEXAS		Drilling Method: AIR/MUD ROTARY		Project Number: 50-01858.16
Geologist: TRACY PAYNE	Driller: CHOATE WELL SERVICE	Drill Rig Type: GARDNER-DENVER 1500		Borehole Diameter: 12.25 Inches
Site Coordinates, UTM in ft.: N: 239440.8800 E: 790109.8500	Total Depth (ft-bgl): 120.00	Surface Elevation(ft) 2450.90	TOC Elevation(ft) 2453.89	PAD Elevation(ft) 2451.44
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (feet)	Saturation	OVM (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				101–108		Sandy Clay(CL) - Low plasticity, very soft, saturated, red.
				103–108		Gravel (GW) - Angular, very dense, well graded, granule to pebble, sandstone, limestone, quartz, saturated.
				108–120		Clay (CH) - High plasticity, stiff, dry, red, Dockum Formation.
				120		BORING TERMINATED AT 120 FEET BELOW GRADE



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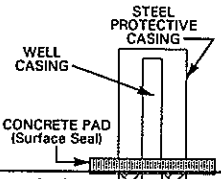
F-204A Austin (8-95)

WELL CONSTRUCTION LOG

WELL NO. RIW-213

Client: FINA OIL AND CHEMICAL COMPANY		Start Date: 10-23-96	End Date: 10-24-96	Page 1 of 3
Site: BIG SPRING, TEXAS		Drilling Method: AIR/MUD ROTARY		Project Number: 50-01858.16
Geologist: TRACY PAYNE	Driller: CHOATE WELL SERVICE	Drill Rig Type: GARDNER-DENVER 1500		Borehole Diameter: 12.25 Inches
Site Coordinates, UTM in ft.: N: 239301.7500 E: 789629.8800	Total Depth (ft-bgl): 120.00	Surface Elevation(ft) 2453.30	TOC Elevation(ft) 2456.26	PAD Elevation(ft) 2453.76
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (feet)	Saturation	OVM (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				1–49		Silty Sand (SM) - Fine grained, 40% silt, compact, dry, dark brown.
						Silty Sand (SM) - Very fine grained, 40% silt, dense to very dense, dry, pinkish tan, occasional moderately - well cemented sandstone seams.
						Silty Sand (SM) - Similar to above.
						Silty Sand (SM) - Similar to above.
						Silty Sand SM) - Similar to above except reddish tan.
						Silty Sand (SM) - Similar to above except darker reddish tan.



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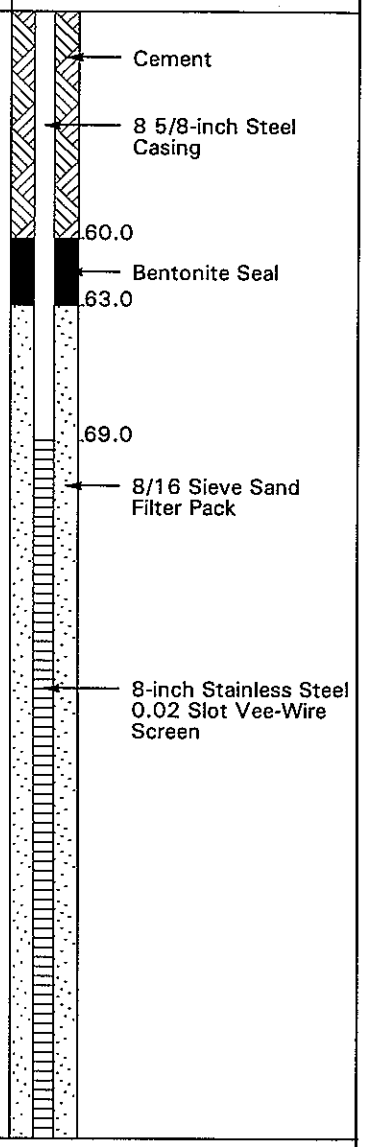
WELL CONSTRUCTION LOG

WELL NO. RIW-213

Client: FINA OIL AND CHEMICAL COMPANY		Start Date: 10-23-96	End Date: 10-24-96	Page 2 of 3
Site: BIG SPRING, TEXAS		Drilling Method: AIR/MUD ROTARY		Project Number: 50-01858.16
Geologist: TRACY PAYNE	Driller: CHOATE WELL SERVICE	Drill Rig Type: GARDNER-DENVER 1500		Borehole Diameter: 12.25 Inches
Site Coordinates, UTM in ft.: N: 239301.7500 E: 789629.8800	Total Depth (ft-bgl): 120.00	Surface Elevation(ft) 2453.30	TOC Elevation(ft) 2456.26	PAD Elevation(ft) 2453.76
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (feet)	Saturation	OVM (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				51–99		Silty Sand (SM) - Very fine grained, 40% silt, dense to very dense, dry, dark reddish tan, occasional moderately-well cemented sandstone seams.
						Damp at 55 feet
						Silty Sand (SM) - Similar to above, 10-20% silt.
						Silty Sand (SM) - Similar to above, moist at 70 feet.
		▽				Saturation at 76 feet below grade.
						Silty Sand (SM) - Similar to above with occasional sandstone seams, saturated.
						Silty Sand(SM) - Similar to above.



WELL 01858 1/7/97

F-204A Austin (8-95)

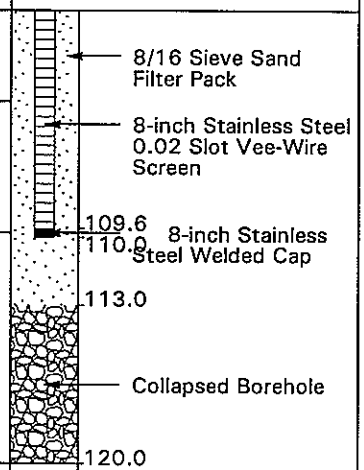
Continued Next Page

WELL CONSTRUCTION LOG

WELL NO. RIW-213

Client: FINA OIL AND CHEMICAL COMPANY		Start Date: 10-23-96	End Date: 10-24-96	Page 3 of 3
Site: BIG SPRING, TEXAS		Drilling Method: AIR/MUD ROTARY		Project Number: 50-01858.16
Geologist: TRACY PAYNE	Driller: CHOATE WELL SERVICE	Drill Rig Type: GARDNER-DENVER 1500		Borehole Diameter: 12.25 Inches
Site Coordinates, UTM in ft.: N: 239301.7500 E: 789629.8800	Total Depth (ft-bgl): 120.00	Surface Elevation(ft) 2453.30	TOC Elevation(ft) 2456.26	PAD Elevation(ft) 2453.76
Datum Description Source:	Datum Elev. (ft):	Water Level Depth Below Grade(ft):	Date:	Time:

Sample Type	Recovery (feet)	Saturation	OVM (ppm)	Depth (feet)	Stratigraphy	LITHOLOGIC DESCRIPTION
				101–104		Sandy Clay (CL) - Low plasticity, 20% fine sand, very soft, saturated, red.
				105–109		Gravel (GW) - Well graded, subangular to subrounded, compact, granule to pebble, saturated.
				110–120		Clay (CH) - High plasticity, stiff, red, dry, Dockum Formation.
				121–149		BORING TERMINATED AT 120 FEET BELOW GRADE



WELL 01858 1/7/97

F-204A Austin (8-95)

Alon USA, LP
Alon USA Big Spring Refinery

Hazardous Waste Permit 50140
Part B Application
SWR No. 30083 / RN100250869 / CN600881783

APPENDIX XI
ATTACHMENT C
SAMPLE AND ANALYSIS PLAN

Alon USA, LP

Attachment XI.D.3.c(1)

Sample and Analysis Plan
SWR30083 / CP50140 / RN100250869 /

CN600881783

Big Spring Refinery – Big Spring, Texas

January 2024

Robert L. Sherrill, PG
Geologist

Signature

Texas PG-120
Registration Number & State

Atlas Technical Consultants, LLC TX#56038
Texas Geoscience Firm & Registration Number

January 28, 2024
Date

Professional Seal

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SECTION 1 INTRODUCTION

1.1 Purpose and Intent of Plan

The following is a Sample and Analysis Plan (SAP) prepared for the Corrective Action Monitoring Program under Compliance Plan CP50140 at the Alon USA Big Spring, Texas Refinery. This SAP will replace the current plan prepared in March 1997, revised in May 2001 and again in October 2010.

The SAP was prepared to meet the requirements of 30 Texas Administrative Code (TAC) §335.163(4) and (5) and also 40 Code of Federal Regulations (CFR 270.30(j). The structure of this SAP follows the outline provided as Attachment C of the Texas Commission on Environmental Quality (TCEQ) Part B Permit Application. This document was prepared as a "stand-alone" document for use by the facility during the renewed compliance period. The SAP will cover the Corrective Action Sampling of Compliance Solid Waste Management Units (SWMUs) Site E and the Boundary Interim Corrective Action (BICA) area.

1.2 Sampling Event Programs

The following is a summary of key details concerning the four sampling programs conducted at the two SWMUs:

SITE E SWMU MONITORING:

Sampling Program Designation	SITE E [1]
Event Schedule:	January-February of each calendar Year
Analytical Sampling Method:	Low-flow Purge and Sample[(2)]
Field Parameter Sampling Method:	Low-flow Purge and Sample[(2)]
Number of Wells Sampled:	8
Number QA Samples:	2 Trip Blanks, 1 Field Blank, 1 Duplicate
Laboratory Analysis:	Method SW846, 8260B:

- Acetone
- Benzene
- Carbon disulfide
- Ethylbenzene
- Methyl Ethyl Ketone
- Toluene
- Xylenes, total

Method SW846, 8270D:

- Benzenethiol
- Cresols, total
- Diethyl phthalate
- 2,4-Dimethylphenol
- 1-Methylnaphthalene
- 2-Methylnaphthalene
- Naphthalene
- Pentachlorophenol
- Phenol
- Pyridene

Method SW846, 6020A:

- Arsenic
- Beryllium
- Nickel
- Selenium
- Vanadium

Field Analysis:
- Hydrogen Ion Potential (pH)
- Specific Conductance
- Turbidity
- Oxidation-Reduction Potential
- Temperature
- Dissolved Oxygen

Field Measurements:
- Depth to Top LNAPL
- Depth to Top Groundwater
- Depth to Top DNAPL
- Total Well Depth

Purging Method: Low-flow Purge and Sample[(2)]
Purging Tool: Dedicated Pneumatic Pump
Sampling Tool: Dedicated Pneumatic Pump
Purge-Water Handling: Collected, to Wastewater Treater
Complete Sample Container Set (per well)
- 3 ea, 40-ml VOA Vial with HCl
- 2 ea, 1-liter Glass bottle, no treat
- 1 ea, 500-ml Plastic bottle with HNO_3

Sampling Program Designation: SITE E [7]
Event Schedule: July -August of each calendar Year
Analytical Sampling Method: Low-flow Purge and Sample[(2)]
Field Parameter Sampling Method: Low-flow Purge and Sample[(2)]
Number of Wells Sampled: 8
Number QA Samples: 1 Trip Blanks, 1 Field Blank, 1 Duplicate
Laboratory Analysis: <u>Method SW846, 8260B:</u>
- Benzene
- Ethylbenzene
- Toluene
- Xylenes, total

<u>Method SW846, 8270D:</u>
- Benzenethiol

Field Analysis:
- Hydrogen Ion Potential (pH)
- Specific Conductance
- Turbidity
- Oxidation-Reduction Potential
- Temperature
- Dissolved Oxygen

Field Measurements:
- Depth to Top LNAPL
- Depth to Top Groundwater
- Depth to Top DNAPL
- Total Well Depth

Purging Method: Low-flow Purge and Sample[(2)]
Purging Tool: Dedicated Pneumatic Pump
Sampling Tool: Dedicated Pneumatic Pump

Purge-Water Handling	Collected, to Wastewater Treater
Complete Sample Container Set (per well)	• 3 ea, 40-ml VOA Vial with HCl • 2 ea, 1-liter Glass bottle, no treat

BICA AREA SWMU MONITORING:

Sampling Program Designation	BICA-LF
Event Schedule:	January-February and July -August of each calendar Year
Analytical Sampling Method:	Low-flow Purge and Sample(2)
Field Parameter Sampling Method:	Low-flow Purge and Sample(2)
Number of Wells Sampled:	51
Number QA Samples:	5 Trip Blanks, 5 Field Blank, 5 Duplicate
Laboratory Analysis:	Method SW846, 8260B: • Benzene Method SM2540 or E160A: • Total Dissolved Solids
Field Analysis:	• Hydrogen Ion Potential (pH) • Specific Conductance • Turbidity • Oxidation-Reduction Potential • Temperature • Dissolved Oxygen
Field Measurements:	• Depth to Top LNAPL • Depth to Top Groundwater • Depth to Top DNAPL • Total Well Depth
Purging Method:	Low-flow Purge and Sample(2)
Purging Tool:	Dedicated Pneumatic Pump
Sampling Tool:	Dedicated Pneumatic Pump
Purge-Water Handling	Collected, to Wastewater Treater
Complete Sample Container Set (per well)	• 3 ea, 40-ml VOA Vial with HCl • 1 ea, 500-ml Plastic bottle, no treat

Sampling Program Designation	BICA-VP
Event Schedule:	January-February and July -August of each calendar Year
Analytical Sampling Method:	Volume Purge and Sample
Field Parameter Sampling Method:	Volume Purge and Sample
Number of Wells Sampled:	13
Number QA Samples:	2 Trip Blanks, 1 Field Blank, 1 Duplicate
Laboratory Analysis:	Method SW846, 8260B: • Benzene • 1,2-Dichloroethane Method SW846, 6020A: • Arsenic Method SM2540 or E160A: • Total Dissolved Solids
Field Analysis:	• Hydrogen Ion Potential (pH) • Specific Conductance

Field Measurements:	• Turbidity • Oxidation-Reduction Potential • Temperature • Dissolved Oxygen • Depth to Top LNAPL • Depth to Top Groundwater • Depth to Top DNAPL • Total Well Depth
Purging Method:	Volume Purge and Sample
Purging Tool:	Dedicated Submersible Recovery Pump
Sampling Tool:	Dedicated Submersible Recovery Pump
Purge-Water Handling	Piped to Recovery Stripper
Complete Sample Container Set (per well)	• 3 ea, 40-ml VOA Vial with HCl • 1 ea, 500-ml Plastic bottle, no treat • 1 ea, 500-ml Plastic bottle with HNO_3

1.3 Field Activity Sequence

Each specific sampling program has a different sequence of the sampling process that prevents interference of one activity with another. The following are the order in which activities will occur for each type of sampling program:

Low-Flow Purge & Sample (BICA-LF, Site E)	Volume Flow Purge & Sample (BICA-VP)
Well-Head Inspection	Well-Head Inspection
⇓	⇓
Fluid Level Measurements	Fluid Level Measurements
⇓	⇓
Purging	Purging
⇓	⇓
Field Analysis Readings	Field Analysis Readings
⇓	⇓
Collect Volatile Organic Sample	Collect Volatile Organic Sample
⇓	⇓
Collect Semivolatile Sample	Collect Inorganic Sample
⇓	⇓
Collect TDS Sample	Collect TDS Sample
⇓	⇓
Ship Samples	Ship Samples

SECTION 2 PRE-FIELD ACTIVITIES

This Section will discuss the key aspects of sample planning and record-keeping.

2.1 Equipment and Supplies

Field personnel responsible for conducting the sampling activities discussed in this SAP will verify that necessary equipment and supplies for obtaining the groundwater samples at the site are available. A routine equipment check will be performed that includes the following:

- Meters, probes, standards and other field measurement equipment;
- Filtration equipment, if applicable;
- Appropriate sample containers with labels;
- Applicable field and trip blanks;
- Sample shippers or coolers;
- Bagged ice;
- Electronic water level indicator;
- Log book with appropriate forms and indelible ink marker;
- Appropriate field sampling record forms;
- Chain of Custody forms;
- Well evacuation equipment;
- Purge-water container (55-gallon drum with lid). Note that the BICA-VP purge water is hard-piped to treatment, and the BICA-LF and Site E low-flow purge and sample method yields approximately 1.1 gallons per well of purge water (~total of 65-gallons);
- Disposable bailer(s) for field measurements;
- Cleaning and decontamination solutions, distilled water, and decontamination equipment, including buckets and scrub brushes and plastic sheeting, etc.;
- Monitoring well keys (obtain on-site from Alon);
- Tools;
- Calculator;
- Personal Protection Safety Equipment – minimum hard-hat, steel-toe leather boots, eye protection, noise protection, individual H^2S monitor, Health and Safety Plan, Daily Safety Meeting form;
- Copy of Sampling and Analysis Procedures; and
- Copy of the Work Plan and an event-specific Technical Memorandum.

2.2 Recordkeeping

Pertinent details of the field activities will be documented in the field log book and/or event-record forms. The information will include procedures used, observations made, results

obtained and pertinent logistic information. At a minimum, the information captured will include:

- The names of the field personnel conducting the sampling event;
- The purpose and provision(s) of the compliance plan requiring the sampling event;
- Weather conditions at the time of sampling;
- Date and time of sampling;
- Well identification;
- Visual assessment of the well's integrity;
- Monitoring well measurements including: total well depth, static water level depth, measurement of total depth of the well, height of water column, volume of the well, depth to, and thickness of, any phase-separated hydrocarbons (i.e., LNAPL and/or DNAPL);
- Well purging procedures including equipment, purge volumes, pumping rates, and well purge time;
- Sampling methods including well sampling sequence, constituent sampling sequence, sampling equipment, and withdrawal procedures;
- Visual and measured water quality parameters required for analysis such as appearance, pH, conductivity, temperature, and turbidity;
- Sample preservation and handling procedures including types of sample bottles, sample identification numbers, preservatives used, and internal temperature of field and shipping containers; and
- Deviations from the procedures specified in these Procedures will also be documented in the field log book and/or the event record forms.
- Attachment CP SAP – A contains the preprinted log book forms that will aid in documenting the sampling and capturing of pertinent information. These preprinted forms include:
- Groundwater Sampling Program Information Sheet. This form is specific to each individual sampling program and includes shipping information for both the samples and the analytical results (also provided to the contract laboratory), pertinent references and provisions of the compliance plan, wells (and key well information) to be sampled under that specific program, analytical constituents, methods, and holding times, sampling containers and their specific analytical constituents, purging and sampling methods, type and number of field quality assurance samples and their analytical parameters, and the total number of sample containers required by each program for both groundwater samples and field QA samples;
- Field Data Sheet. This sheet (one per well) is utilized to capture specific purging and sampling data as well as non-changing information such as well ID, grid location, screen depth, well size and material, and pump-setting (which can be pre-printed on the well-specific form) to aid the field team in pre-sample collection setup at each well;
- Daily Activities Log. This form is completed by the sample-team leader each day and documents the progress of the sampling event, site conditions, weather, etc;

- Daily Tailgate Safety Meeting Record. This form documents the daily safety meeting held on-site prior to the start of work. This is to insure that all members of the sampling team are familiar with the health and safety plan and protocols, and to inform the team of any special conditions that may apply for that day;
- Calibration Logs. These forms are included to guide the field personal in performing the scheduled calibrations on the field instrumentation. These forms are designed in accordance with the instrument manufacturer's recommended procedures. It should be noted that during the ten-year compliance period, these forms will be altered or replaced as new instruments are acquired and utilized.
- Also included in Attachment CP SAP – A, even though they are not part of the Log Book, are the chain of custody forms used to track the collection, control, and receipt of the samples collected. There is a chain of custody form specific to each of the four sampling programs.

At the end of each sampling event, all completed log book forms and notes will become part of the event permanent file.

Prior to arrive on site to perform a sampling event, each member of the sampling team will have reviewed the Event-Specific Health and Safety Plan, their Emergency Risk Contingency Plan, and have been certified through the Alon USA LP Site Specific Health and Safety Training. At all times while on-site, each member of the team will have the following personal protection equipment:

- Hard Hat;
- Steel-toe boots;
- Eye Protection;
- Hearing Protection;
- Nomex® Coveralls; and
- H2S Monitor.

The team leader or his designee will conduct a daily "Tailgate" Safety meeting to discuss those safety issues specific to the day's activities.

In addition to the information provided in this SAP, the following pertinent information can be found in the Compliance Plan:

- Permit Section VI. - Geology Report;
- Permit Section XI.C. - Compliance Monitoring Program;
- CP Table IVA – Detected Hazardous constituents and the Groundwater Protection Standard for Compliance Monitoring;
- CP Table V – Designation of Wells by Function; and
- Attachment B – Well Design and Construction Specifications.

SECTION 3 PRE-WELL PURGING ACTIVITIES

3.1 Monitoring Component Inspection

For all sampling programs, a well-head inspection will be conducted prior to entering the wells. All findings will be documented in the log book forms. The inspection will consist of the following:

- Inspect the above-grade well casing and cap for cracks, deterioration and tampering. For wells with slip-over locking steel protective casing, note any damage or tampering;
- Is the well still clearly labeled as to the well ID?;
- In general, is the well secure?;
- Inspect the well pad for evidence of off-set, cracks, deterioration, erosion, settling, animal burrows, and insect burrows or nests; and
- Inspect the dedicated equipment such as pump lines, tubing, or connectors, for structural integrity or signs of deterioration.

3.2 Pre-Purging/Sampling Measurements

Prior to purging and sampling, fluid levels and total well depth will be recorded for each well. For the BICA-LF, BICA-VP, Site E [1] and SITE E [7] programs, the depth to the top of groundwater, LNAPL (if present), DNAPL (if present), and total well depth will be completed prior to purging.

3.2.1 Field Equipment Calibration

Field monitoring equipment, including the pH meter, conductivity meter and turbidity meter will be field calibrated each day prior to use at the sampling site. Instrument calibration will be rechecked at a minimum of once per day following use. A record of each calibration or check event will be recorded in the log book Field Calibration Form (shown in Attachment CP SAP-A). The record will include the date and time of the calibration, the person conducting the calibration, the instrument serial number, the lot number of the calibration standard and the calibration result.

Calibration of the pH meter will follow procedures in the equipment manual supplied by the manufacturer. The pH meter will normally be calibrated using two or three standard buffer solutions of pH 7.0 and pH 4.0 and/or pH 10.0. The two pH standards chosen will bracket the anticipated sample pH. The calibration will be verified by immediately measuring the pH of the buffers used for calibration. The pH will be verified every daily by measuring the pH of one or both of the standard buffer solutions. Instrument readings will be recorded to the nearest 0.1 pH units in the log book on the Field Calibration Form.

Calibration of the specific conductivity meter will follow the procedures provided in the equipment manual supplied by the manufacturer. The specific conductivity meter will normally be calibrated using a standard conductivity solution of potassium chloride. Instrument readings will be recorded to the nearest 10 units for readings under 1,000

micromhos per centimeter (umhos/cm) and to the nearest 100 units for readings over 1,000 micromhos per centimeter. The calibration curve will be verified once daily by measuring the specific conductance of the standard solution.

Calibration of the turbidity meter will be in accordance with the manufacturer's instructions. The turbidity meter will normally be calibrated using 2 standard solutions, for example, 0 NTU standard and a 10 NTU standard. If the instrument readings do not agree within 10% of the calibration standards, then the unit must be recalibrated.

Standards used to calibrate the pH, conductivity and turbidity meters, will be traceable to the National Bureau of Standards (NBS) or National Institute for Standards and Technology (NIST). If the standard requires preparation, it will be prepared according to published procedures using reagent-grade chemicals and standards of specified priority traceable to the NBS or NIST.

Field equipment will be maintained in accordance with the manufacturers' recommended schedules and procedures, as indicated below:

INSTRUMENT	MAINTENANCE SCHEDULE	MAINTENANCE DESCRIPTION
Hydrolab® Multi-Function Meter for pH, ORP (Eh), Dissolved Oxygen, Temperature and Specific Conductance	Daily and periodically	Verify that batteries are adequate and replace, if necessary. Field calibrate according to the owner's manual provided by the manufacturer. Rinse electrodes with deionized or distilled water; periodically replace electrode plug to prevent drying. Clean with mild acid, base, or alcohol solution.
Turbidity Meter	Daily and periodically	Rinse glass cuvette in distilled water. If glass cuvette becomes stained, replace. Verify that batteries are adequate and replace if necessary. Field calibrate according to owner's manual provided by manufacturer.

3.2.2 Pre-Purge Measurements

Prior to well purging and ground-water sampling, the (1) depth to ground water and (2) total well depth from the top of well casing will be measured to the nearest 0.01 ft using an interface device that distinguishes between water and hydrocarbon. Note that if light, non-aqueous, phase-separated hydrocarbon is identified floating on the top of the water column, the thickness will be measured but the groundwater will not be sampled or field tested. Water levels will be measured from an established, surveyed measuring point marked on top of the well casing (north side).

When using the interface electronic fluid level indicator, the probe will be inserted into the well and lowered to the fluid surface. The depth to fluid, relative to the measuring point, will be determined from the electronic indicator. This distance, top of well casing to top of fluid, will be recorded to determine the groundwater elevation to the nearest

0.01 foot. If LNAPL is encountered, the depth to LNAPL and depth to groundwater will both be recorded. All measurements will be recorded on groundwater sampling field data sheet shown in Attachment CP SAP-A.

The electronic tape will be decontaminated after each use by the following method in accordance with EPA *Operating Procedures for Field Equipment Cleaning and Decontamination*[6]:

- Wash with soap and tap water;
- Rinse with tap water; and
- Rinse with de-ionized water.

3.3 Other Outside Influences

Other items that could have an effect on the integrity of the samples include weather and inadvertent tampering. Documentation will be made as to the general weather conditions during both the morning and afternoon of each day. At a minimum this documentation will include precipitation (rain or snow), temperatures, approximate wind speed and wind direction. This information will be recorded on the Daily Activities Record included as part of the log book and shown in Attachment CP SAP-A.

No one outside of the sampling team should have contact with either the collected sample or the sample and shipping containers. Should someone outside the team have contact then it should be noted in the log book forms including time, location (well being sampled or wells the containers are utilized for), and the name and company affiliation of the person.

SECTION 4 PRE-WELL SAMPLING ACTIVITIES

This Section will discuss the well purging methods for each of the procedural programs being performed.

The field parameters measuring equipment utilized during well purging are as follows:

Parameter	Equipment
pH	A multi-parameter water quality meter that will measure pH, ORP (Eh), Dissolved Oxygen, Temperature and Specific Conductance
Oxidation-Reduction Potential (ORP)	
Dissolved Oxygen (DO)	
Temperature	
Specific Conductivity	
Turbidity	Turbidity Meter

The procedures used to obtain pH, ORP, DO, temperature, specific conductivity and turbidity measurements will follow guidelines provided in the equipment manuals and as specified in SW-846. Demonstration of the stability of these measurements during the low-flow purging of will be used to indicate that representative ground-water samples are collected. All probes utilized in field measurements will be cleaned by wiping the probes dry, rinsing with distilled water, and wiping dry. These instruments will not come in contact with soil, surface water or ground-water samples collected for laboratory analysis. The glass cuvette used to measure turbidity will be cleaned by rinsing with distilled water.

Table CP SAP-2 indicates the range and average of the purge constituents under the current Permit (since the March 2015 event) for the purpose of instrument calibration.

4.1 Low-Flow Purging Methods

Groundwater samples collected using low-flow purging are carefully screened for specific field parameters until those parameters fall within specific stabilized conditions. At that time, the samples are collected. All measurements are made in-situ to preserve redox integrity. The instrument used for these reading is the HydroLab® or an equivalent instrument.

As purging progresses, groundwater is analyzed in-situ for dissolved oxygen, pH, oxidation-reduction potential (ORP), temperature and specific conductance with the field instrument. For each well, a dedicated pump and dedicated Tygon tubing will be utilized. A new set of disposable nitrile gloves will be dedicated in order to reduce the possibility of cross contamination. Water will be removed from the screened interval of each well using the dedicated pneumatic pump set on low-flow (i.e., less than 0.8 gpm) which will cause minimal disturbance of in-situ conditions. Groundwater flow will be directed from this in-situ starting point to a flow-through cell located at the ground surface without ambient air contact. The

flow-through cell will be attached to a multi-functional probe, which measures the parameters of pH, Eh, dissolved oxygen, temperature and specific conductance. The parameter probe will be calibrated prior to use according to the manufacturer's standards (see Attachment CP SAP-A for the calibration record form that is part of the log book).

During the low-flow purging and sampling process, the groundwater wells will be pumped at a low rate that will create a minimum of drawdown as technically possible for the permeability of the formation[(2)]. All sampled wells will be purged with readings recorded roughly every 5 minutes until field parameters are stabilized for two consecutive readings to at least the following criteria:

- pH - 3% for specific conductance;
- Specific Conductance – 3%;
- Temperature – 0.2°C
- Turbidity – 20%
- ORP - 10 millivolts; and
- DO - 10%.

Purge water will be collected in sealed containers and transported to the facility wastewater treatment system for disposal.

4.2 Volume Purging Methods

Prior to collecting ground-water samples, monitoring wells will be purged. With respect to volume, an adequate purge is normally achieved when three to five well volumes have been removed.

With respect to the groundwater chemistry, an adequate purge is achieved when the pH, specific conductance, ORP, DO, and temperature of the ground water have stabilized and the turbidity has either stabilized or is below 10 Nephelometric turbidity units (NTUs). Stabilization occurs when, for at least two consecutive measurements:

- pH - 3% for specific conductance;
- Specific Conductance – 3%;
- Temperature – 0.2oC
- Turbidity – 20%
- ORP - 10 millivolts; and
- DO - 10%.

There are no set criteria for establishing how many total sets of measurements are adequate to document stability of parameters, but at a minimum, measurements will be made following the purging of each well volume.

For wells with slow recovery, which is not anticipated due to sampling history, attempts should be made to avoid purging them to dryness. It is particularly important that wells be sampled

as soon as possible after purging. Sampling of wells which have a slow recovery should be scheduled so that they can be purged and sampled in the same day, after adequate volume has recovered. Wells of this type should not be purged at the end of one day and sampled the following day.

To calculate the volume of ground water contained in the well casing, the following equation will be used:

$V = 0.041\, d^2 h$

where:

V = volume of water (gallons);

d = inside diameter of well casing (inches),

Nominal Pipe Size (inches)	Schedule 40 PVC Internal Diameter (inches / inches^2)	Schedule 80 PVC Internal Diameter (inches / inches^2)
2.0	2.037 / 4.149	1.939 / 3.760
4.0	4.026 / 16.209	3.826 / 14.638
6.0	6.065 / 36.784	5.761 / 33.189
8.0	7.942 / 63.075	7.565 / 57.229

and,

h = column height of standing water within the monitoring well (feet).

The column height of standing water will be calculated by subtracting the depth to ground water measurement from the total depth of the monitoring well. Pertinent monitoring well purging calculations, measurements and notes will be recorded on the Field Data Record Form (also shown in Attachment CP SAP-A). Field sampling observations regarding noticeable odor, weather conditions, sample color and sampling equipment problems will be documented. All purging volume removal will be performed using the dedicated electric submersible production pumps.

All purge water is hard piped to the groundwater reinjection stripper for treatment and reinjection and handling of the purge water is not required.

SECTION 5 WELL SAMPLING

This section will discuss the groundwater sample extraction procedures for each of the sampling programs being conducted.

5.1 Low-Flow Purging Methods

Once field parameters are stabilized and the measurements are recorded, the well will be sampled.

Groundwater samples will be collected in accordance with the sequence shown in SAP Section 1.3. Groundwater samples will be collected in containers supplied by the laboratory with appropriate preservation techniques employed where necessary. Groundwater will be collected directly from the screened interval of each well via the sampling tube.

Sample containers and analysis are summarized in CP SAP Table 1 and indicated as follows:

Constituents		Sample Containers [Holding Time]
SITE E [1] – January Event Only		
Volatile Organics [8260C]		
Acetone	Methyl Ethyl Ketone	3 – 40-ml VOA vial with HCl [14 days]
Benzene	Toluene	
Carbon disulfide	Xylenes, total	
Ethylbenzene		
Semivolatile Organics [8270D]		
Benzenethiol	2-Methylnaphthalene	2 – 1-liter Glass Bottle, no treat [7 days]
Cresols, total	Naphthalene	
Diethyl phthalate	Pentachlorophenol	
2,4-Dimethylphenol	Phenol	
1-Methylnaphthalene	Pyridene	
Inorganics [6020A]		
Arsenic	Selenium	1 – 500-ml Plastic Bottle with HNO_3 [180 days]
Beryllium	Vanadium	
Nickel		
SITE E [7] – July Event Only		
Volatile Organics [8260C]		
Benzene	Toluene	3 – 40-ml VOA vial with HCl [14 days]
Ethylbenzene	Xylenes, total	
Semivolatile Organics [8270D]		
Benzenethiol		2 – 1-liter Glass Bottle, no treat [7 days]
BICA-LF – January and July Events		
Volatile Organics [8260C]		
Benzene		3 – 40-ml VOA vial with HCl [14 days]
General Indicator [E160A]		
Total Dissolved Solids		1 – 500-ml Plastic Bottle, no treat [7 days]

The sample labels on all sample containers will be filled in completely just prior to the filling of the container. All samples will be placed in an ice-filled cooler immediately following collection in order to chill samples to 4^{O} C. The sample container lids will be tightly sealed, and each sample container will be placed into a ziplock®-style bag with bubble wrapping. All ice to be shipped with the samples will be placed into large (recommend 2-gallon) ziplock®-style plastic bags and then into the coolers, and melted water will be drained from the cooler as needed. Chain of Custody (COC) forms will be filled out completely by the field sampler. The sampler will retain one copy and the remaining COC will be placed in a water-tight plastic bag and placed in the appropriate shipping cooler. The samples will then be shipped via overnight delivery to the laboratory conducting the analyses. Attachment CP SAP-A contains copies of the Groundwater Sampling Field Data Sheets that will be utilized for the recording of data during purging and sampling and the chain of custody forms to be used during the sampling event. Table CP-SAP-2 shows the labels and seals to be utilized.

5.2 Volume Purging Methods

Once the conditions of proper purge have been met, samples are collected in the sequence indicated in SAP Section 1.3. All samples are collected from the sample portal located at each production pump well head.

Sample containers and analysis are summarized in CP SAP Table 1 and indicated as follows:

BICA-VP – January and July Events

Volatile Organics [8260C]		
Benzene	1,2-Dichloroethane	3 – 40-ml VOA vial with HCl [14 days]
Inorganics [6020A]		
Arsenic		1 – 500-ml Plastic Bottle with HNO_3 [180 days]
General Indicator [E160A]		
Total Dissolved Solids		1 – 500-ml Plastic Bottle, no treat [7 days]

The sample labels on all sample containers will be filled in completely just prior to the filling of the container. All samples will be placed in an ice-filled cooler immediately following collection in order to chill samples to 4^{O} C. The sample container lids will be tightly sealed, and each sample container will be placed into a ziplock®-style bag with bubble wrapping. All ice to be shipped with the samples will be placed into large (recommend 2-gallon) ziplock®-style plastic bags and then into the coolers, and melted water will be drained from the cooler as needed. Chain of Custody (COC) forms will be filled out completely by the field sampler. The sampler will retain one copy and the remaining COC will be placed in a water-tight plastic bag and placed in the appropriate shipping cooler. The samples will then be shipped via overnight delivery to the laboratory conducting the analyses. Attachment CP SAP-A contains copies of the Groundwater Sampling Field Data Sheets that will be utilized for the recording of data during purging and sampling and the chain of custody forms to be used during the sampling event. Table CP-SAP-2 shows the labels and seals to be utilized.

The following is a summary of the total containers required per event for both sampling methods:

JANUARY EVENT

40-ml VOA Vial with HCl (3 containers per sample):

BICA-LF Program:	Number Samples	Number Containers
Wells Sampled:	51	153
Field Blanks:	5	15
Trip Blanks:	5	15
Duplicate Samples:	5	15
TOTALS:	66	198

BICA-VP Program:	Number Samples	Number Containers
Wells Sampled:	13	39
Field Blanks:	1	3
Trip Blanks:	2	6
Duplicate Samples:	1	3
TOTALS:	17	51

SITE E [1] Program:	Number Samples	Number Containers
Wells Sampled:	8	24
Field Blanks:	1	3
Trip Blanks:	1	3
Duplicate Samples:	1	3
TOTALS:	11	33

1-Liter Glass Bottle, No Treat (2 Containers per Sample:

SITE E [1] Program:	Number Samples	Number Containers
Wells Sampled:	8	16
Field Blanks:	1	2
Trip Blanks:	0	0
Duplicate Samples:	1	2
TOTALS:	10	20

500-ml Plastic Bottle, No Treat (1 Container per Sample:

BICA-LF Program:	Number Samples	Number Containers
Wells Sampled:	51	51
Field Blanks:	5	5
Trip Blanks:	0	0
Duplicate Samples:	5	5
TOTALS:	61	61

BICA-VP Program:	Number Samples	Number Containers
Wells Sampled:	13	13
Field Blanks:	1	1
Trip Blanks:	0	0
Duplicate Samples:	1	1
TOTALS:	15	15

500-ml Plastic Bottle with HNO_3 (1 Container per Sample:

BICA-VP Program:	Number Samples	Number Containers
Wells Sampled:	13	13
Field Blanks:	1	1
Trip Blanks:	0	0
Duplicate Samples:	1	1
TOTALS:	15	15

SITE E [1] Program:	Number Samples	Number Containers
Wells Sampled:	8	8
Field Blanks:	1	1
Trip Blanks:	0	0
Duplicate Samples:	1	1
TOTALS:	10	10

JULY EVENT

40-ml VOA Vial with HCl (3 containers per sample):

BICA-LF Program:	Number Samples	Number Containers
Wells Sampled:	51	153
Field Blanks:	5	15
Trip Blanks:	5	15
Duplicate Samples:	5	15
TOTALS:	66	198

BICA-VP Program:	Number Samples	Number Containers
Wells Sampled:	13	39
Field Blanks:	1	3
Trip Blanks:	2	6
Duplicate Samples:	1	3
TOTALS:	17	51

SITE E [7] Program:	Number Samples	Number Containers
Wells Sampled:	8	24
Field Blanks:	1	3
Trip Blanks:	1	3
Duplicate Samples:	1	3
TOTALS:	11	33

1-Liter Glass Bottle, No Treat (2 Containers per Sample):

SITE E [7] Program:	Number Samples	Number Containers
Wells Sampled:	8	16
Field Blanks:	1	2
Trip Blanks:	0	0
Duplicate Samples:	1	2
TOTALS:	10	20

500-ml Plastic Bottle, No Treat (1 Container per Sample:

BICA-LF Program:	Number Samples	Number Containers
Wells Sampled:	51	51
Field Blanks:	5	5
Trip Blanks:	0	0
Duplicate Samples:	5	5
TOTALS:	61	61

BICA-VP Program:	Number Samples	Number Containers
Wells Sampled:	13	13
Field Blanks:	1	1
Trip Blanks:	0	0
Duplicate Samples:	1	1
TOTALS:	15	15

500-ml Plastic Bottle with HNO_3 (1 Container per Sample:

BICA-VP Program:	Number Samples	Number Containers
Wells Sampled:	13	13
Field Blanks:	1	1
Trip Blanks:	0	0
Duplicate Samples:	1	1
TOTALS:	15	15

SECTION 6 POST-SAMPLING ACTIVITIES

6.1 Decontamination

The decontamination of all non-dedicated sampling equipment (i.e., the field measurement probes and meters) will be performed as follows:

- Probes used in measuring pH, temperature and specific conductivity will be cleaned by wiping the probes dry, rinsing with distilled water, and wiping dry.
- The glass cuvette used to measure turbidity will be cleaned by rinsing with distilled water.
- The electronic tape will be decontaminated after each use by the following method in accordance with EPA *Operating Procedures for Field Equipment Cleaning and Decontamination* as follows:
    - Wash line and probe with soap and tap water;
    - Rinse with tap water; and
    - Rinse with distilled water.

All other equipment utilized is dedicated to individual wells.

6.2 Analytical Assignments

Information concerning the laboratory analysis to be performed are summarized in CP SAP Table 1 and in Section 1 and in Attachment CP-SAP-A, *Summary of Complete Bottle Sets Per Sampling Program*, *Program Summary Sheet BICA-LF, Program Summary Sheet BICA-VP, Program Summary Sheet SITE E [1],* and *Program Summary Sheet SITE E [7]*.

6.3 Chain of Custody

CP SAP Attachment-A contains a copy of the chain of custody form to be utilized for the compliance monitoring. As discussed above, the chain of custody form will be completed prior to leaving the well following sampling. The chain of custody will accompany the samples until their ultimate destination at the analytical laboratory. The chain of custody form will be placed in a 1-gallon Zip-Lock® plastic bag and taped to the inside lid of the appropriate shipping container (i.e., ice chest). The procedures of check in and final information completion are discussed in the following Sections. The chain of custody form will include the following information:

- Sample identification number (well number);
- Signature and inclusive times and dates of the collector and each person to have control of the samples;
- Date and time of collection;
- Sample type or matrix material (e.g., groundwater);
- Sampling program;

- Type and number of containers for each sample;
- Parameters requested for analysis;
- Preservatives used; and
- Internal temperature of the shipping container when sealed for shipping and when opened by the laboratory.

The sample container and the shipping containers will be sealed with security tape. Table CP SAP-2 is an example of both the sample container label and the security tape for sealing the sample and shipping containers.

SECTION 7 SAMPLING QUALITY CONTROL

The management objectives for this SAP are as follows:

- To monitor the quality of data generated so that the analytical goals of the activities are met;
- To maintain the value of any data produced for use in current and future decision making;
- To review the validity and integrity of the site data; and
- To control the quality of work performed by subcontractors and support services so that they maintain the same performance quality standards as those defined by this SAP.

The policies outlined in this SAP are designed to provide assurance that the monitoring activities will yield comprehensive and valid results which comply with applicable federal and state regulations and requirements.

Specific procedures for sampling, chain of custody, laboratory instruments calibration, laboratory analysis, reporting of data, internal quality control (QC) audits, preventive maintenance of field equipment, and corrective action are described in other sections of this SAP. The purpose of this section is to address the specific objectives for accuracy, precision, completeness, representativeness, and comparability.

7.1 Level of Quality Control Effort

Environmental samples will be collected using the procedures outlined in this SAP. Blanks will be collected to assess potential contamination due to sampling, shipping, or ambient conditions to which the samples are exposed. Field duplicates field blank, and matrix spike samples will be analyzed to assess the quality of the data resulting from the field sampling program. Field duplicate samples are analyzed to check for sampling and analytical reproducibility. One field blank and one field duplicate will be collected or generated at a minimum of one in ten groundwater samples and analyzed for all applicable constituents for that program. One trip blank will be prepared for each shipping container with samples being analyzed for volatile organics and will be analyzed for the same volatile organic constituents. Laboratory matrix spikes provide information about the effect of the sample matrix on the preparation and measurement methodology. Matrix spike duplicate samples will be generated during the preparation procedure prior to analysis.

All matrix spikes are performed in duplicate and are hereinafter referred to as MS/MSD samples. One MS/MSD pair will be generated at a minimum of one in twenty groundwater samples per sample matrix, or one per batch.

The level of QC effort provided by the laboratory will be equivalent to the level of QC effort specified under the appropriate approved test methods.

7.2 Quality Assurance Objectives for Analytical Measurements

Professional personnel will oversee the field activities to meet the overall project objectives. The quality assurance (QA) objectives will establish the guidelines which define the quality of the environmental measurements required to meet the objectives specified and the acceptance criteria of the analytical protocols. This section addresses objectives for precision, accuracy, completeness, representativeness, and comparability.

QA objectives for precision, accuracy, and completeness for each major measurement parameter will be established for site activities. These objectives cover both laboratory and field activities. All measurements are to be representative of the groundwater tested. All data will be calculated and reported in units consistent with similar data measurements from the site to allow easy comparison of site data. Definitions for precision, accuracy, completeness, representativeness and comparability are as follows:

Precision: A measure of mutual agreement among individual measurements of the same property, usually under prescribed similar conditions. Precision is best expressed in terms of the standard deviation or alternatively, by relative percent difference IX_1-X_2 100/mean of X. Various measures of precision exist, depending upon the "prescribed similar conditions."

Accuracy: The degree of agreement of a measurement (or an average of measurements of the same thing), X, with an accepted reference or true value, T. expressed as the percentage difference between the two values, (100%)T-X/T. Accuracy is a measure of the bias in a system.

Completeness: A measure of the amount of valid data obtained from a measurement system compared to the amount that was expected to be obtained under normal conditions.

Representativeness: Expresses the degree to which data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, a process condition, or an environmental condition. Representativeness is a qualitative parameter which is dependent upon the proper design of the sampling program and proper laboratory protocol. The sampling network is designed to provide data representative of site conditions. The rationale of the sampling network is discussed in a Work Plan. Representativeness will be satisfied by following the SAP, using proper sampling techniques and following proper analytical procedures.

Comparability: Expresses the confidence with which one data set can be compared with another. The extent to which existing and future analytical data will be comparable depends on the similarity of sampling and analytical methods.

The levels of laboratory QC effort for SW-846 procedures are also specified in this SAP. For typical activities outlined in this SAP, 85 percent completeness is expected for laboratory data and 85 percent completeness is expected for field data and sample collection.

7.3 Field Measurements QA

The accuracy of field measurements of pH, conductivity and turbidity will be assessed through pre-measurement calibrations and post-measurement verifications in the field. The pH meter will be field calibrated and verified by performing two measurements on standard buffer solutions. Calibration of the pH meter will follow procedures in the equipment manual supplied by the manufacturer. The pH meter will normally be calibrated using two standard buffer solutions of pH 7.0 and pH 4.0. These two pH standards are used since they bracket the anticipated sample pH range. The calibration will be verified by immediately measuring the pH of the buffers used for calibration. The pH will be verified each day by measuring the pH of one or both of the standard buffer solutions. Instrument readings will be recorded to the nearest 0.1 pH units on the Field Calibration Log in the log book and located herein in Attachment CP SAP–A. Precision will be assessed through duplicate measurements on one water sample per day or every 20th sample whichever is more frequent. A 2% relative percent difference is the criteria for acceptable field pH data.

Calibration of the specific conductivity meter will follow the procedures provided in the equipment manual supplied by the manufacturer. The specific conductivity meter will normally be calibrated using a standard conductivity solution of potassium chloride. Instrument readings will be recorded to the nearest 10 units for readings under 1,000 micromhos per centimeter (umhos/cm) and to the nearest 100 units for readings over 1,000 micromhos per centimeter. The calibration curve will be verified once daily by measuring the specific conductance of the standard solution.

Calibration of the turbidity meter will be in accordance with the manufacturer's instructions. The turbidity meter will normally be calibrated using 2 standard solutions, for example, 0 NTU standard and a 10 NTU standard. If the instrument readings do not agree within 10% of the calibration standards, then the unit must be recalibrated.

Standards used to calibrate the pH, conductivity and turbidity meters, will be traceable to the National Bureau of Standards (NBS) or National Institute for Standards and Technology (NIST). If the standard requires preparation, it will be prepared according to published procedures using reagent-grade chemicals and standards of specified priority traceable to the NBS or NIST.

7.4 Sample Custody

Sample custody will be initiated at the time of sample collection. Detailed documentation of sampling procedures and sample identification will be recorded during sampling in field log book. A Field Data Form will be completed for each set of samples. Pre-cleaned sampling containers, with appropriate preservatives, will be supplied directly by the contract laboratory. All sample containers will have sample labels completed with indelible ink and sealed with custody seals.

In order to document sample possession from time of collection to time of sample receipt by the laboratory, a Chain-of-Custody Form will be maintained for each sample set. The Chain-of-Custody Record Form (see Attachment CP SAP-A) will be placed in a plastic bag, secured inside the sample shipping container and accompany the sample shipment to the laboratory. Individuals relinquishing and receiving the sample, will sign, date and note the time on the Chain-of-Custody Form. Custody seals, signed and dated by the field representative and

packing tape will be used to seal the shipping container. Chain-of-Custody procedures will follow those specified in SW-846[5]. Shipping records and airbills also provide means of tracking the sample shipment and will be retained as part of the chain-of-custody documentation. Airbill numbers for each shipping container will be recorded on the field notebook form.

7.5 Laboratory Operations

Chain-of-Custody (COC) procedures employed by the laboratory will be conducted in accordance with the following procedure:

1. Requirements for Receiving Samples:

   a. Each sample or group of samples must be accompanied by a COC;

   b. The COC must be signed and dated (with a time) by the person who is relinquishing the sample(s) under "RELINQUISHED BY;"

   c. The laboratory personnel must sign the COC as "RECEIVED BY:" with a date and time;

   d. The sampler's signature must be on the COC;

   e. The project number and name are required before laboratory acceptance. The project number will be on the COC;

   f. The client's sample name and the date and time of collection are required on the COC; and

   g. The following items will be noted on the COC:

      1. The laboratory personnel who opens the sample cooler must sign and date (with time) the COC as "COOLER OPENED BY".

      2. The pH will be checked by the laboratory and recorded for all water samples except volatile analyses. Any preservative added will be listed on the COC by the sampler.

      3. The matrix and number of containers will be on the COC and any discrepancies will be noted on the COC by the laboratory. Note any broken samples or improper containers as well.

      4. The temperature of the samples and condition of the seal on the cooler will be noted on the COC by the laboratory. The condition of the seal must be noted as "sealed" or "not sealed."

      5. The temperature will be noted as "Cooled at 4 degrees C" by the laboratory if samples were properly received on ice.

      6. The analyses requested will be listed for each sample.

   h. If any of the above requirements are not met, the samples will be stored in the lab refrigerator and the client must be notified of the problem. The samples cannot be logged in or signed as "RECEIVED FOR LABORATORY BY:" until all problems are corrected.

2. Logging in Samples

   a. Insure that requirements for sample receiving have been met (see previous section).

b. The following information is typically entered into a Laboratory Sample Log Book:
    1. Laboratory # =Enter the next number in sequence from the last one logged in.
    2. Client ID = client's sample name
    3. Matrix = matrix of sample
    4. Container = type of sample container and capacity
    5. D.Rec. = date the sample was received by the lab
    6. D.Col. = date the sample was collected
    7. Chain = Was there a COC? (should always be yes)
    8. Location = refrigerator number and shelf number of the sample location
    9. Note or analysis = any notes about samples or analysis requested should be listed here.
c. Make labels with laboratory number and transfer them to the appropriate sample container.
d. Samples would then be processed according to the order given by Laboratory Management.

Laboratory Calibrations - Calibration procedures employed by the laboratory will be those specified in SW-846[7], other approved methods or in the individual instrument manual.

Calibration standards will be traceable to NIST or USEPA, whenever such standards are available. Eleven standards will have the labeled concentration verified by comparison with another standard prior to use.

The working lifetime of standard preparations are dependent upon the compound types comprising the standards. Cost standards have shelf lives specified in the applicable method. Otherwise, a standard is considered to be acceptable until comparison with a reference material indicates a problem.

Instruments will be calibrated before being put into service and will be recalibrated at intervals consistent with the manufacturer's and/or method recommendations. Instrument response and calibration will be verified between the regular recalibrations as specified by the appropriate method. Detection limit studies will be performed on each instrument for each analyte determined on the instrument whenever an instrument undergoes a major modification or annually.

7.6 Reduction and Validation of Field Measurement Data

Temperature, specific conductivity, pH, turbidity, and water levels in wells will be measured in the field and checked by the Field Site Manager or his designated representative. Field data will be reviewed at the time of collection for accuracy, reproducibility (precision), representativeness and comparability to expected or typical results. If field data are determined to be inconsistent with historical data the field instruments will be checked to verify operational functions are correct. Ground-water monitoring protocols will also be reviewed. Anomalous data will be checked by performing additional measurements. A decision regarding the validity of field data will be made prior to leaving the sampling site.

7.7 Reduction and Validation of Laboratory Data

The laboratory's procedures for analytical data validation will be based on results of certified laboratories internal quality control procedures.

Data Review - A data package composed of analytical results and supporting documentation will be prepared and checked by the chemist performing the analysis. This review will include the following items: data interpretation, quantitation, quality control data inspection for completeness and compliance, QC results and raw data. This data package will be reviewed by a second analyst proficient in the appropriate methodologies. Upon completion of the peer review, the data package will be provided to the Laboratory QA Officer. Data reduction, evaluation, and reporting will be conducted by the laboratory.

Data Validation - Chemical data will be validated by professional project personnel, qualified and experienced in data validation, using the *Laboratory Data Validation Functional Guidelines for Organic and Inorganic Analytes* (U.S. EPA, 1988). The data validation will be performed by or under the supervision of the Project QA Officer. Compounds detected in samples will be checked against possible blank contamination. If an analyte is found in a blank, any detection of the same analyte in a sample will be considered a laboratory artifact if the detected analyte is less than ten times the blank contamination for "common laboratory contaminants" or less than five times the blank contamination for any other analyte.

Data Reporting – At a minimum, data typically included in monitoring reports are water level, field parameters, field measurements, and ground-water quality data. Laboratory analytical reports for ground water will include the following information:

- Sample identification numbers;
- Dates sampled and analyzed;
- Parameters measured;
- Reporting units;
- % Recovery;
- Analytical methods;
- Practical Quantitation Limits; and
- Original Chain-of-Custody Records.

Water level data reports will include the following:

- Measuring point elevation;
- Depth to ground water and, if present, LNAPL and DNAPL; and
- Ground-water and, if present, LNAPL and DNAPL elevations.

Project File - Laboratory data generated will be stored by the laboratory in project files. The files will include bench-sheets or copies of notebook pages with sample weights, dilutions, concentrations, data reduction, instrument logs, and raw data.

Documentation of laboratory data, assessment, and validation, and field notes and measurements will be maintained in the Project File of the project manager conducting assessment activities.

SECTION 8 EVALUATION OF ANALYTICAL RESULTS

The following are guidance for the evaluation of the analytical results from the compliance sampling program.

8.1 Statistical Comparison

The results of the sample analysis are statistically compared to the $^{GW}GW_{Class\ 3}$ groundwater protection standards identified in Table CP-SAP-1. Analytical results for individual wells that exceed the standards will be noted in the semiannual reporting.

8.2 Statistical Trend Evaluation

The Mann-Kendall statistical test[3] is utilized to determine the dynamics of the individual dissolved constituent plumes as well as the trend of aquifer oxygenation. The Mann-Kendall test is a nonparametric test that can be used to define the stability of a solute plume (*i.e.,* Stable, Diminishing, or Expanding) based on concentration trends within individual wells. Stability evaluation results from the Mann-Kendall test are based on a calculated "S" value for each COC evaluated on a per-well basis as compared to a confidence level chart that is used to estimate the individual COC concentration trend. All key well S values for an individual COC are then considered together and evaluated qualitatively to determine evidence of an overall plume trend. For the test to be considered, the individual well must have a minimum of four analytical results for a COC with a maximum of the last ten results utilized.

SECTION 9 CITATIONS AND REFERENCES

SAP Citation Notes:

(1) EPA Solid Waste Guidance Document, Test Methods for Evaluating Solid Wastes, SW-846, Third Edition, 1986 (U.S. EPA SW-846)

(2) Puls, R. W. and Barcelona, M. J., 1996. Low-flow (Minimal Drawdow) Ground-Water Sampling Procedures, United States Environmental Protection Agency Ground Water Issue, 540/S-95/504.

(3) Gilbert, R.O., 1987, Statistical Methods for Environmental Pollution Monitoring, Van Nostrand Reinhold, New York.

General References Utilized But Not Cited:

EPA Region 4 Science and Ecosystem Support Division, *Operating Procedure for Groundwater Sampling*, Publication No. SESDPROC-301-R1, November 2007, 30 pgs

EPA Region 4 Science and Ecosystem Support Division, *Operating Procedure for Field Equipment Cleaning and Decontamination*, Publication No. SESDPROC-205-R1, November 2007, 30 pgs

EPA Region 4 Science and Ecosystem Support Division, *Groundwater Level and Well Depth Measurement*, Publication No. SESDPROC-105-R1, November 2007, 8 pgs

EPA Region 4 Science and Ecosystem Support Division, *Sample and Evidence Management*, Publication No. SESDPROC-005-R1, November 2007, 15 pgs

EPA Office of Solid Waste, *RCRA Ground-Water Monitoring (Draft Technical Guidance),* 1992

TABLES

Table CP SAP-1

Summary of Sample Containers and Analysis

Alon USA Big Spring Refinery

SWMU	Program Title	Sampling Method	Schedule	Constituents	Method[(1)]	GWPS (mg/l)	Holding Time	QA Samples	Sample Container		
BICA	BICA-LF	Low-Flow Purge & Sample	Semiannual January & July	Benzene	8260C	0.5	14 days	F / T / D	3 ea, 40-ml VOA vial with HCl		
				Total Dissolved Solids	E160A	na	7 days	F / D	1 ea, 500-ml Plastic, no treat		
				pH	Field	na	Immediate	na	measured in field		
				Specific Conductance	Field	na		na			
				Turbidity	Field	na		na			
				ORP (Eh)	Field	na		na			
				Temperature	Field	na		na			
				Dissolved Oxygen	Field	na		na			
				Sampling Locations (51 total)	MW-52	MW-79	IW-149	MW-154	MW-166	MW-220	MW-225A
					MW-52A	MW-79A	IW-149A^	MW-154A	MW-166A	MW-220A	MW-227
					IW-58	MW-80	IW-150	MW-155	MW-214	MW-221A	MW-227A
					IW-58A	MW-80A	IW-150A	MW-155A	MW-214A	MW-223	
					MW-76	MW-109	MW-152^	MW-163	MW-215	MW-223A	
					MW-76A	MW-109A	MW-152A	MW-163A	MW-215A	MW-224	
					MW-78	MW-125	MW-153	MW-165R	MW-218	MW-224A	
					MW-78A	MW-125A	MW-153A	MW-165AR	MW-218A	MW-225	
	BICA-VP	**Volume Purge and Sample**	**Semiannual January & July**	Benzene	8260C	0.5	14 Days	F / T / D	3 ea, 40-ml VOA vial with HCl		
				1,2-Dichloroethane	8260C	0.5		F / D			
				Arsenic	6020A	1	180 Days	F / D	1 ea, 500-ml, Plastic with HNO_3		
				Total Dissolved Solids	E160A	na	7 Days	F / D	1 ea, 500-ml Plastic, no treat		
				pH	Field	na	Immediate	na	measured in field		
				Specific Conductance	Field	na		na			
				Turbidity	Field	na		na			
				ORP (Eh)	Field	na		na			
				Temperature	Field	na		na			
				Dissolved Oxygen	Field	na		na			
				Sampling Locations (13 total)	RW-106	RW-141	RW-144	RW-146	RW-179	RW-194	MW-221
					RW-112	RW-142	RW-145	RW-147	RW-192	RW-195	

Table CP SAP-1

Summary of Sample Containers and Analysis

Alon USA Big Spring Refinery

SWMU	Program Title	Sampling Method	Schedule	Constituents	Method[(1)]	GWPS (mg/l)	Holding Time	QA Samples	Sample Container
SITE E	SITE E [1]	Low-Flow Purge & Sample	Semiannual January (only)	Acetone	8260C	2200	14 days	F / T / D	3 ea, 40-ml VOA vial with HCl
				Benzene	8260C	0.5			
				Carbon disulfide	8260C	240			
				Ethylbenzene	8260C	70			
				Methyl Ethyl Ketone	8260C	1500			
				Toluene	8260C	100			
				Xylenes, total	8260C	1000			
				Benzenethiol	8270D	0.24	7 days	F / D	2 ea, 1-liter, Glass, no treat
				Cresols, total	8270D	120			
				Diethyl phthalate	8270D	2000			
				Dimethylphenol, 2,4-	8270D	49			
				Methylnaphthalene, 1-	8270D	3.1			
				Methylnaphthalene, 2-	8270D	9.8			
				Naphthalene	8270D	49			
				Pentachlorophenol	8270D	0.1			
				Phenol	8270D	730			
				Pyridene	8270D	2.4			
				Arsenic	6020A	1	180 Days	F / D	1 ea, 500-ml, Plastic with HNO_3
				Beryllium	6020A	0.4			
				Nickel	6020A	49			
				Selenium	6020A	5			
				Vanadium	6020A	4.4			
				pH	Field	na	Immediate	na	measured in field
				Specific Conductance	Field	na		na	
				Turbidity	Field	na		na	
				ORP (Eh)	Field	na		na	
				Temperature	Field	na		na	
				Dissolved Oxygen	Field	na		na	
				Sampling Locations (8 total)	MW-38	MW-39	MW-40	MW-41	
					MW-38A	MW-39A	MW-40A	MW-41A	

Table CP SAP-1

Summary of Sample Containers and Analysis

Alon USA Big Spring Refinery

SWMU	Program Title	Sampling Method	Schedule	Constituents	Method[(1)]	GWPS (mg/l)	Holding Time	QA Samples	Sample Container
SITE E (continued)	SITE E [7]	Low-Flow Purge & Sample	Semiannual July (only)	Benzene	8260C	0.5	14 days	F / T / D	3 ea, 40-ml VOA vial with HCl
				Ethylbenzene	8260C	70			
				Toluene	8260C	100			
				Xylenes, total	8260C	1000			
				Benzenethiol	8270D	0.24	7 days	F / D	2 ea, 1-liter, Glass, no treat
				pH	Field	na	Immediate	na	measured in field
				Specific Conductance	Field	na		na	
				Turbidity	Field	na		na	
				ORP (Eh)	Field	na		na	
				Temperature	Field	na		na	
				Dissolved Oxygen	Field	na		na	
				Sampling Locations (8 total)	MW-38	MW-39	MW-40	MW-41	
					MW-38A	MW-39A	MW-40A	MW-41A	

TABLE CP SAP-2

MARCH 2015 to JULY 2023 RESULTS RANGE FOR INSTRUMENT CALIBRATION

Alon USA - Big Spring Refinery - CP 50140

Program(s)	Number of Wells	Constituent	Units	Numbeer Data	Number Reults >MDL	RESULTS RANGE OF VALUES		
						Maximum	Minimum	Average
BICA-LF	49	Dissolved Oxygen	mg/L	820	820	**8.5**	**0.2**	**2.3**
BICA-LF	49	Hydrogen Ion Potential (pH)	Stnd Unit	820	820	**8.45**	**5.65**	**6.91**
BICA-LF	49	Oxidation-Reduction Potential	mV	820	820	**(+)212.7**	**(-)283.1**	**(+)0.2**
BICA-LF	49	Specific Conductance	µmhos/cm	578	578	**41,500**	**12**	**7,158**
BICA-LF	49	Temperature	^{o}C	578	578	**29.7**	**14.6**	**21.8**
BICA-LF	49	Turbidity	NTU	578	578	**74.00**	**0.70**	**6.35**
BICA-VP	10	Dissolved Oxygen	mg/L	170	170	**70.1**	**0.3**	**3.3**
BICA-VP	10	Hydrogen Ion Potential (pH)	Stnd Unit	170	170	**9.93**	**5.86**	**6.93**
BICA-VP	10	Oxidation-Reduction Potential	mV	170	170	**(+)191.1**	**(-)345.1**	**(-)7.3**
BICA-VP	10	Specific Conductance	µmhos/cm	120	120	**32,190**	**434**	**12,374**
BICA-VP	10	Temperature	^{o}C	120	120	**39.3**	**15.7**	**22.1**
BICA-VP	10	Turbidity	NTU	120	120	**303.00**	**0.50**	**6.44**
SITE E [1 & 7]	8	Dissolved Oxygen	mg/L	133	133	**6.9**	**0.9**	**1.8**
SITE E [1 & 7]	8	Hydrogen Ion Potential (pH)	Stnd Unit	133	133	**8.15**	**5.42**	**6.81**
SITE E [1 & 7]	8	Oxidation-Reduction Potential	mV	133	133	**(+)165.3**	**(-)260.2**	**(-)127.7**
SITE E [1 & 7]	8	Specific Conductance	µmhos/cm	94	94	**118,900**	**1,623**	**31,851**
SITE E [1 & 7]	8	Temperature	^{o}C	94	94	**33.6**	**14.6**	**22.4**
SITE E [1 & 7]	8	Turbidity	NTU	94	94	**56.0**	**3.7**	**11.9**

Wells Which Historically Contained LNAPL:

BICA-LF	1	RW-152
BICA-VP	11	RW-106, RW-173, RW-174, RW-175, RW-177, RW-178, RW-179, RW-185, RW-192, MW-221, MW-228
SITE E	0	No Wells

TABLE CP SAP-3

SAMPLING LABELS AND SEALS

Alon USA - Big Spring Refinery - CP 50140

SAMPLE CUSTODY SEAL:

ACCUTEST LABORATORIES **ACCUTEST LABORATORIES**

CUSTODY SEAL CUSTODY SEAL CUSTODY SEAL CUSTODY SEAL

DATE / TIME SEALED:_____ INITIALS:_____

TRIP BLANK SAMPLE SEAL:

ACCUTEST LABORATORIES

TRIP BLANK DO NOT BREAK SEAL-TRIP BLANK DO NOT BREAK SEAL

SAMPLE BOTTLE LABEL:

Facility #:

Sample ID:

Test:

Cont. type

Matrix No. containers:

Project Name:

Project #:

Date/Time Collected: Initials:

Client Code: BO#:

ATTACHMENT CP SAP-A LOG BOOK FIELD FORMS

- Program Summary Sheet – BICA-LF Program
- Program Summary Sheet – BICA-VP Program
- Program Summary Sheet – SITE E [1]
- Program Summary Sheet – SITE E [7]
- Key Well Information – Compliance Sampling
- Monitoring Well Purging and Sampling Record
- Water Quality Meter Calibration Log
- Daily Tailgate Safety Meeting Record
- Daily Activities Log
- Chain of Custody Form

Program Summary Sheet
BOUNDARY INTERIM CORRECTIVE ACTION (non-production wells)

GENERAL INFORMATION:

Client & Facility	ALON USA, LP-Alon USA Big Spring, Texas Refinery	**Memorandum ATTACHMENT**	**# PAGES**
Form Updated	May 16, 2021	**ATTCH CP SAP-A**	**2**
Program Designator	**BICA-LF**	**Matrix Sampled:**	
Sampling Method	**LOW-FLOW PURGE & SAMPLE**	**GROUNDWATER**	
Deliever Samples To	SGS AccuTest - Electa Brown - 10165 Harwin Drive, Ste 150 - (713) 271-4700 - Electa.Brown@sgs.com		
Send Results To	DELEK US - Nishanth (Nick) Singh - IH-20 & Refinery Road, Big Spring, TX 79720 - (361) 228-0996 - nishanth.singh@delekus.com		
	ATLAS - Robert Sherrill - 2499 South Capital Of Texas Hwy - Bldg A, Suite 100 - Austin, TX 78746 - 512-470-8710 - robert.sherrill@oneatlas.com		
Regulatory Reference	2014 Compliance Plan Tables III, IIIA, IV, IVA, and the 2010 Sampling and Analysis Plan		

Sampling Event Scheduled For	**JAN**	**FEB**	**MAR**	**APR**	**MAY**	**JUN**
SEMIANNUALLY	**JUL**	**AUG**	**SEP**	**OCT**	**NOV**	**DEC**

Special Conditions	**DO NOT SAMPLE WELLS CONTAINING LNAPL**
Analytical Report Type	**TRRP**

LOCATIONS

See Table 1 (Well Setting Summary) for Well-Specific Information

^ - Purge Water Requires Hazardous Waste Lable (exceed in last 4 events)

Well No.	Map Panel	Well No.	Map Panel	Well No.	Map Panel	Well No.	Map Panel
MW-52	B	**IW-149**	L	**MW-166**	M	**MW-225A**	C
MW-52A	B	**IW-149A^**	L	**MW-166A**	M	**MW-227**	C
IW-58	K	**IW-150**	P	**MW-214**	E	**MW-227A**	C
IW-58A	K	**IW-150A**	P	**MW-214A**	E		
MW-76	B	**MW-152^**	F	**MW-215**	H		
MW-76A	B	**MW-152A**	F	**MW-215A**	H		
MW-78	O	**MW-153**	F	**MW-218**	H		
MW-78A	O	**MW-153A**	F	**MW-218A**	H		
MW-79	O	**MW-154**	J	**MW-220**	D		
MW-79A	O	**MW-154A**	J	**MW-220A**	D		
MW-80	K	**MW-155**	I	**MW-221A**	D		
MW-80A	K	**MW-155A**	I	**MW-223**	B		
MW-109	O	**MW-163**	J	**MW-223A**	B		
MW-109A	O	**MW-163A**	J	**MW-224**	B		
MW-125	J	**MW-165R**	M	**MW-224A**	B		
MW-125A	J	**MW-165AR**	M	**MW-225**	C		

SAMPLE COLLECTION & ANALYSIS INFORMATION:

#	Parameter	Method	Holding Time	Note	Sample Containers PER LOCATION			
					No.	Size	Type	Preserv.
1	Benzene (VOC)	8260C	14 days		3	40-ml	VOA	HCl
2	Total Dissolved Solids (TDS)	E160A	7 days		1	500-ml	Plastic	no treat
3	pH	Field	In-Field	These parameters are measured in the field using field meters	MEASURED IN FIELD			
4	Specific Conductance	Field	In-Field					
5	Turbidity	Field	In-Field					
6	ORP (Eh)	Field	In-Field					
7	Termperature	Field	In-Field					
8	Dissolved Oxygen	Field	In-Field					

QA Sample Type	Frequency	Applie to Parameters #:	Estimated #
FIELD BLANKS (FB)	1 Per 10 Samples Colected	1, 2	5
TRIP BLANKS (TB)	1 per Ice Chest Shipped	1	5
DUPLICATE SAMPLES (DUP)	1 Per 10 Samples Colected	1, 2	5

Program Summary Sheet
BOUNDARY INTERIM CORRECTIVE ACTION (non-production wells)

GENERAL INFORMATION:

Client & Facility	ALON USA, LP- Alon USA Big Spring, Texas Refinery	**Memorandum ATTACHMENT**	**# PAGES**
Form Updated	May 16, 2021	**ATTCH CP SAP-A**	**2**
Program Designator	**BICA-LF**	**Matrix Sampled:**	
Sampling Method	**LOW-FLOW PURGE & SAMPLE**	**GROUNDWATER**	

TYPE AND NUMBER OF SAMPLE CONTAINERS PER PROGRAM:

Container Type	Type of Analysis (see Parameter No.)	# of Field Blanks	# of Trip Blanks	# of Dup. Samples	# Locations	# Bottles per Loc.	TOTAL
40-milliliter VOA vial with HCl	1	5	5	5	51	3	**198**
500-milliliter Plastic, no treat	2	5	0	5	51	1	**61**

Program Summary Sheet
BOUNDARY INTERIM CORRECTIVE ACTION (production wells)

GENERAL INFORMATION:

Client & Facility	ALON USA, LP - Alon USA Big Spring, Texas Refinery	**Memorandum ATTACHMENT**	**# PAGES**
Form Updated	May 16, 2021	**ATTCH CP SAP-A**	**1**
Program Designator	**BICA-VP**	**Matrix Sampled:**	
Sampling Method	**VOLUME PURGE & SAMPLE**	**GROUNDWATER**	
Deliever Samples To	SGS AccuTest - Electa Brown - 10165 Harwin Drive, Ste 150 - (713) 271-4700 - Electa.Brown@sgs.com		
Send Results To	DELEK US - Nishanth (Nick) Singh - IH-20 & Refinery Road, Big Spring, TX 79720 - (361) 228-0996 - nishanth.singh@delekus.com		
	ATLAS - Robert Sherrill - 2499 South Capital Of Texas Hwy - Bldg A, Suite 100 - Austin, TX 78746 - 512-470-8710 - robert.sherrill@oneatlas.com		
Regulatory Reference	2014 Compliance Plan Tables III, IIIA, IV, IVA, and the 2010 Sampling and Analysis Plan		

Sampling Event Scheduled For	**JAN**	**FEB**	**MAR**	**APR**	**MAY**	**JUN**	
SEMIANNUALLY	**JUL**	**AUG**	**SEP**	**OCT**	**NOV**	**DEC**	
Special Conditions	**DO NOT SAMPLE WELLS CONTAINING LNAPL**						
Analytical Report Type	**TRRP**						

LOCATIONS	**Well No.**	**Map Panel**	**Well No.**	**Map Panel**	**Well No.**	**Map Panel**	**Well No.**	**Map Panel**
See Table 1 (Well Setting Summary) for Well-Specific Information	**RW-106^**	K	**RW-144**	P	**RW-179^**	H	**MW-221^**	D
	RW-112	O	**RW-145**	P	**RW-192^**	K2		
^ - Purge Water Requires Hazardous Waste Lable (exceed in last 4 events)	**RW-141**	O	**RW-146**	L	**RW-194**	L		
	RW-142	O	**RW-147**	L	**RW-195**	P		

SAMPLE COLLECTION & ANALYSIS INFORMATION:

#	Parameter	Method	Holding Time	Note	Sample Containers PER LOCATION			
					No.	Size	Type	Preserv.
1	Benzene (VOC)	8260B	14 days		3	40-ml	VOA	HCl
2	1,2-Dichloroethane (VOC)	8260B	14 days					
3	Arsenic (METAL)	6020A	180 days		1	500-ml	Plastic	HNO3
4	Total Dissolved Solids (TDS)	E160A	7 days		1	500-ml	Plastic	no treat
5	pH	Field	In-Field	These parameters are measured in the field using field meters	MEASURED IN FIELD			
6	Specific Conductance	Field	In-Field					
7	Turbidity	Field	In-Field					
8	ORP (Eh)	Field	In-Field					
9	Termperature	Field	In-Field					
10	Dissolved Oxygen	Field	In-Field					

QA Sample Type	Frequency	Applie to Parameters #:	Estimated #
FIELD BLANKS (FB)	1 Per 10 Samples Colected	1 through 4	1
TRIP BLANKS (TB)	1 per Ice Chest Shipped	1 & 2	2
DUPLICATE SAMPLES (DUP)	1 Per 10 Samples Colected	1 through 4	1

TYPE AND NUMBER OF SAMPLE CONTAINERS PER PROGRAM:

Container Type	Type of Analysis (see Parameter No.)	# of Field Blanks	# of Trip Blanks	# of Dup. Samples	# Locations	# Bottles per Loc.	TOTAL
40-ml VOA Vial, HCl	1 & 2	1	2	1	13	3	**51**
500-ml, Plastic, HNO_3	3	1	0	1	13	1	**15**
500-ml, Plastic, no treat	4	1	0	1	13	1	**15**

Program Summary Sheet
SITE E LTU POST-CLOSURE - TABLE IV

GENERAL INFORMATION:

Client & Facility	ALON USA, LP - Alon USA Big Spring, Texas Refinery	**Memorandum ATTACHMENT**	**# PAGES**
Form Updated	November 9, 2020	**ATTCH CP SAP-A**	**2**
Program Designator	**SITE E [1]**	**Matrix Sampled:**	
Sampling Method	**LOW-FLOW PURGE & SAMPLE**	**GROUNDWATER**	
Deliever Samples To	SGS AccuTest - Electa Brown - 10165 Harwin Drive, Ste 150 - (713) 271-4700 - Electa.Brown@sgs.com		
Send Results To	DELEK US - Nishanth (Nick) Singh - IH-20 & Refinery Road, Big Spring, TX 79720 - (361) 228-0996 - nishanth.singh@delekus.com		
	ATLAS - Robert Sherrill - 2499 South Capital Of Texas Hwy - Bldg A, Suite 100 - Austin, TX 78746 - 512-470-8710 - robert.sherrill@oneatlas.com		
Sampling Referenced In	2014 Compliance Plan (Table IV, IVA), Sampling and Analysis Plan issued August 08, 2014		

Event Scheduled For	**JAN**	**FEB**	**MAR**	**APR**	**MAY**	**JUN**	
SEMIANNUALLY	**JUL**	**AUG**	**SEP**	**OCT**	**NOV**	**DEC**	

Special Conditions	**DO NOT SAMPLE WELLS CONTAINING LNAPL**
Analytical Report Type	**TRRP**

LOCATIONS	Well No.	Map Panel	Well No.	Map Panel	Well No.	Map Panel	Well No.	Map Panel
See Table 1 (Well Setting Summary) for Well-Specific Information	**MW-38**	D	**MW-39**	G	**MW-40**	G	**MW-41**	G
	MW-38A	D	**MW-39A**	G	**MW-40A**	G	**MW-41A**	G

^ - Purge Water Requires Precautionary Hazardous Waste Lable due to exceedance within last 4 events)

NOTE: No exceedance since July 2017

SAMPLE COLLECTION & ANALYSIS INFORMATION:

#	Parameter	Method	Holding Time	CAS NUMBER	CP TABLE	Sample Containers PER LOCATION			
						No.	Size	Type	Preserv.
1	Acetone	8260C	14 d	67-64-1	CP IV	3	40-ml	VOA	HCl
2	Benzene	8260C	14 d	71-43-2	CP IV				
3	Carbon disulfide	8260C	14 d	75-15-0	CP IV				
4	Ethylbenzene	8260C	14 d	100-41-4	CP IV				
5	Methyl Ethyl Ketone	8260C	14 d	78-93-3	CP IV				
6	Toluene	8260C	14 d	108-88-3	CP IV				
7	Xylenes, total	8260C	14 d	1330-20-7	CP IV				
8	Benzenethiol	8270D	7 d	108-98-5	CP IV	2	1-liter	Glass	no treat
9	Cresols, total	8270D	7 d	1319-77-3	CP IV				
10	Diethyl phthalate	8270D	7 d	84-66-2	CP IV				
11	Dimethylphenol, 2,4-	8270D	7 d	105-67-9	CP IV				
12	Methylnaphthalene, 1-	8270D	7 d	90-12-0	CP IV				
13	Methylnaphthalene, 2-	8270D	7 d	91-57-6	CP IV				
14	Naphthalene	8270D	7 d	91-20-3	CP IV				
15	Pentachlorophenol	8270D	7 d	87-86-5	CP IV				
16	Phenol	8270D	7 d	108-95-2	CP IV				
17	Pyridene	8270D	7 d	110-86-1	CP IV				
18	Arsenic	6020A	180 d	7440-38-2	CP IV	1	500-ml	Plastic	HNO_3
19	Beryllium	6020A	180 d	7440-41-7	CP IV				
20	Nickel	6020A	180 d	7440-02-0	CP IV				
21	Selenium	6020A	180 d	7782-49-2	CP IV				
22	Vanadium	6020A	180 d	7440-62-2	CP IV				
23	pH	Field	In-Field	These parameters are measured in the field using field meters		MEASURED IN FIELD			
24	Specific Conductance	Field	In-Field						
25	Turbidity	Field	In-Field						
26	ORP (Eh)	Field	In-Field						
27	Termperature	Field	In-Field						
28	Dissolved Oxygen	Field	In-Field						

continued on next page

Program Summary Sheet
SITE E LTU POST-CLOSURE - TABLE IV

GENERAL INFORMATION:

Client & Facility	ALON USA, LP - Alon USA Big Spring, Texas Refinery	**Memorandum ATTACHMENT**	**# PAGES**
Form Updated	November 9, 2020	**ATTCH CP SAP-A**	**2**
Program Designator	**SITE E [1]**	**Matrix Sampled:**	
Sampling Method	**LOW-FLOW PURGE & SAMPLE**	**GROUNDWATER**	

continued from previous page

QA Sample Type	Frequency	Applie to Parameters #:	Estimated #
FIELD BLANKS (FB)	1 Per 10 Samples Colected	1 through 22	1
TRIP BLANKS (TB)	1 per Ice Chest Shipped	1 through 7	1
DUPLICATE SAMPLES (DUP)	1 Per 10 Samples Colected	1 through 22	0

TYPE AND NUMBER OF SAMPLE CONTAINERS PER PROGRAM:

Container Type	Type of Analysis (see Parameter No.)	# of Field Blanks	# of Trip Blanks	# of Dup. Samples	# Locations	# Bottles per Loc.	TOTAL
40-ml VOA Vial, HCl	1 through 7	1	1	1	8	3	**33**
1-liter Glass, no treat	8 through 17	1	0	1	8	2	**20**
500-ml Plastic, HNO_3	18 through 22	1	0	1	8	1	**10**

Program Summary Sheet
SITE E LTU POST-CLOSURE - TABLE IVA

GENERAL INFORMATION:

Client & Facility	ALON USA, LP - Alon USA Big Spring, Texas Refinery	**Memorandum ATTACHMENT**	**# PAGES**
Form Updated	November 9, 2020	**ATTCH CP SAP-A**	**1**
Program Designator	**SITE E [7]**	**Matrix Sampled:**	
Sampling Method	**LOW-FLOW PURGE & SAMPLE**	**GROUNDWATER**	
Deliever Samples To	SGS AccuTest - Electa Brown - 10165 Harwin Drive, Ste 150 - (713) 271-4700 - Electa.Brown@sgs.com		
Send Results To	DELEK US - Nishanth (Nick) Singh - IH-20 & Refinery Road, Big Spring, TX 79720 - (361) 228-0996 - nishanth.singh@delekus.com		
	ATLAS - Robert Sherrill - 2499 South Capital Of Texas Hwy - Bldg A, Suite 100 - Austin, TX 78746 - 512-470-8710 - robert.sherrill@oneatlas.com		
Sampling Referenced In	2014 Compliance Plan (Table IVA), Sampling and Analysis Plan issued August 08, 2014		

Event Scheduled For	**JAN**	**FEB**	**MAR**	**APR**	**MAY**	**JUN**
SEMIANNUALLY	**JUL**	**AUG**	**SEP**	**OCT**	**NOV**	**DEC**

Special Conditions	**DO NOT SAMPLE WELLS CONTAINING LNAPL**
Analytical Report Type	**TRRP**

LOCATIONS	**Well No.**	**Map Panel**	**Well No.**	**Map Panel**	**Well No.**	**Map Panel**	**Well No.**	**Map Panel**
See Table 1 (Well Setting Summary) for Well-Specific Information	**MW-38**	D	**MW-39**	G	**MW-40**	G	**MW-41**	G
	MW-38A	D	**MW-39A**	G	**MW-40A**	G	**MW-41A**	G

^ - Purge Water Requires Precautionary Hazardous Waste Lable due to exceedance within last 4 events)
NOTE: No exceedance since July 2017

SAMPLE COLLECTION & ANALYSIS INFORMATION:

#	Parameter	Method	Holding Time	CAS NUMBER	CP TABLE	Sample Containers PER LOCATION			
						No.	Size	Type	Preserv.
1	Benzene (VOC)	8260C	14 days	71-43-2	CP IVA	3	40-ml	VOA	HCl
2	Toluene (VOC)	8260C	14 days	108-88-3	CP IVA				
3	Ethylbenzene (VOC)	8260C	14 days	100-41-4	CP IVA				
4	Xylenes, total (VOC)	8260C	14 days	1330-20-7	CP IVA				
5	Benzenethiol (SVOC)	8270D	180 days	108-98-5	CP IVA	2	1-liter	Glass	no treat
6	pH	Field	In-Field	These parameters are measured in the field using field meters		MEASURED IN FIELD			
7	Specific Conductance	Field	In-Field						
8	Turbidity	Field	In-Field						
9	ORP (Eh)	Field	In-Field						
10	Termperature	Field	In-Field						
11	Dissolved Oxygen	Field	In-Field						

QA Sample Type	Frequency	Applie to Parameters #:	Estimated #
FIELD BLANKS (FB)	1 Per 10 Samples Colected	1, 2, 3, 4, 5	1
TRIP BLANKS (TB)	1 per Ice Chest Shipped	1, 2, 3, 4	1
DUPLICATE SAMPLES (DUP)	1 Per 10 Samples Colected	1, 2, 3, 4, 5	1

TYPE AND NUMBER OF SAMPLE CONTAINERS PER PROGRAM:

Container Type	Type of Analysis (see Parameter No.)	# of Field Blanks	# of Trip Blanks	# of Dup. Samples	# Locations	# Bottles per Loc.	TOTAL
40-ml VOA Vial, HCl	1, 2, 3, 4	1	1	1	8	3	**33**
1-liter Glass, no treat	5	1	0	1	8	2	**20**

SUMMRY OF COMPLETE BOTTLE-SETS PER SAMPLING PROGRAM

JANUARY EVENT

Container	Program	Analysis	Containers Per Sample	NUMBER OF SAMPLES					TOTAL CONTAINERS
				Wells	Field Blanks	Trip Blanks	Duplicates	TOTAL SAMPLES	
40-ml VOAL Vial with HCl	BICA-LF	Benzene	3	51	5	5	5	66	**198**
{Method 8260]	BICA-VP	Benzene 1,2-Dichloroethane	3	13	1	2	1	17	**51**
	SITE E [1]	Acetone Benzene Carbon disulfide Ethylbenzene Methyl Ethyl Ketone Toluene Xylenes, total	3	8	1	1	2	12	**36**
1-Liter Glass Bottle, no treat	SITE E [1]	Benzenethiol Cresols, total Diethyl phthalate Dimethylphenol, 2,4- Methylnaphthalene, 1- Methylnaphthalene, 2- Naphthalene Pentachlorophenol Phenol Pyridene	2	8	1	0	1	10	**20**
[Method 8270]									
500-ml Plastic Bottle, no treat	BICA-LF	Total Dissolved Solids	1	51	5	0	5	61	**61**
[Method E160A]	BICA-VP	Total Dissolved Solids	1	13	1	0	1	15	**15**
500-ml Plastic Bottle with HNO_3	BICA-VP	Arsenic	1	13	1	0	1	15	**15**
[Method 6020]	SITE E [1]	Arsenic Beryllium Nickel Selenium Vanadium	1	8	1	0	1	10	**10**

SUMMRY OF COMPLETE BOTTLE-SETS PER SAMPLING PROGRAM

JULY EVENT:

Container	Program	Analysis	Containers Per Sample	NUMBER OF SAMPLES					TOTAL CONTAINERS
				Wells	Field Blanks	Trip Blanks	Duplicates	TOTAL SAMPLES	
40-ml VOAL Vial with HCl {Method 8260]	BICA-LF	Benzene	3	51	5	5	5	66	**198**
	BICA-VP	Benzene 1,2-Dichloroethane	3	13	1	2	1	17	**51**
	SITE E [7]	Benzene Toluene Ethylbenzene Xylenes, total	3	8	1	1	1	11	**33**
1-Liter Glass Bottle, no treat [Method 8270]	SITE E [7]	Benzenethiol	2	8	1	0	1	10	**20**
500-ml Plastic Bottle, no treat [Method E160A]	BICA-LF	Total Dissolved Solids	1	51	5	0	5	61	**61**
	BICA-VP	Total Dissolved Solids	1	13	1	0	1	15	**15**
500-ml Plastic Bottle with HNO_3 [Method 6020]	BICA-VP	Arsenic	1	13	1	0	1	15	**15**

Attachment CP SAP-A: Key Well Information - Compliance Sampling

ID	ELEVATIONS			LOCATIONS						WELL COMPLETION					SCREEN		SAT. THICK.		SAMP
						Texas State Plane Coordinate Grid System		GPS Location Coordinate System		Boring	Riser	ZONE	WELL		INTERVALS		Upper	Lower	Pump
WELL NUMBER	Top of Casing (MSL)	Top of Pad (MSL)	Top of Grade (MSL)	MAP PANEL	LOC. AREA	NORTHING	EASTING	LAT	LONG	Depth (feet)	Height (feet)	SCREEN (TMZ)	MATERIAL (in.)	n/a	TOP (bTOC)	BOTTOM (bTOC)	Sand (feet)	Gravel (feet)	Intake (ft-TOC)
SITE E SWMU WELLS [SITE E]																			
MW-38	2500.28	2497.45	2497.28	D	N-E	243667.45	791184.79	32.27469	101.41226	120.0	3.0	U. Sand	2	PVC	98.0	118.0	14.0	na	113.0
MW-38A	2500.25	2497.58	2497.41	D	N-E	243661.31	791170.23	32.27467	101.41231	160.0	2.8	L. Gravel	2	PVC	112.8	148.8	14.0	34.0	115.0
MW-39	2485.47	2482.59	2482.59	G	N-E	243127.76	790961.86	32.27318	101.41292	109.0	2.9	U. Sand	2	PVC	81.9	101.9	19.0	na	98.6
MW-39A	2485.63	2482.88	2482.88	G	N-E	243112.60	790966.53	32.27314	101.41290	140.0	2.8	L. Gravel	2	PVC	101.8	132.8	19.0	30.0	120.0
MW-40	2480.01	2477.28	2477.03	G	C-E	242865.25	791227.21	32.27249	101.41203	107.0	3.0	U. Sand	2	PVC	90.0	110.0	20.0	na	102.0
MW-40A	2479.42	2477.32	2477.07	G	C-E	242861.92	791217.43	32.27248	101.41206	130.0	2.3	L. Gravel	2	PVC	110.4	130.4	20.0	19.5	115.0
MW-41	2489.34	2486.59	2486.26	G	N-E	243095.25	791359.08	32.27313	101.41163	113.0	3.1	U. Sand	2	PVC	93.1	116.1	15.5	na	101.5
MW-41A	2489.88	2487.05	2486.80	G	N-E	243108.37	791358.44	32.27317	101.41163	135.0	3.1	L. Gravel	2	PVC	109.9	133.9	15.5	23.5	120.0
BOUNDARY INTERIM CORRECTIVE ACTION WELLS [BICA]																			
MW-52	2517.86	2515.35	2515.10	B	N-E	247820.40	790138.40	32.28599	-101.41615	120.0	2.8	U. Sand	2	PVC	107.8	127.8	31.0	na	119.0
MW-52A	2517.82	2515.33	2515.08	B	N-E	247818.20	790127.30	32.28598	-101.41618	160.0	2.7	L. Gravel	2	PVC	139.7	159.7	31.0	20.0	150.0
IW-58	2437.84	2435.34	2435.09	K	S-E	238752.07	792323.87	32.26130	101.40799	110.0	2.8	U. Sand	2	PVC	70.3	102.8	15.0	na	76.8
IW-58A	2439.01	2346.38	2435.88	K	S-E	238736.57	792356.78	32.26126	101.40788	110.0	3.1	L. Gravel	2	PVC	89.1	99.1	15.0	13.0	92.1
MW-76	2522.21	2519.47	2519.40	B	N-E	247976.00	790629.76	32.28646	101.41458	130.0	2.8	U. Sand	2	PVC	102.8	122.8	57.0	na	119.5
MW-76A	2521.89	2519.14	2518.99	B	N-E	247974.81	790620.73	32.28646	101.41461	180.0	2.9	L. Gravel	2	PVC	140.9	160.9	57.0	0.0	122.0
MW-78	2418.59	2415.95	2415.90	O	S-E	237751.18	791127.67	32.25843	101.41174	65.0	2.7	U. Sand	2	PVC	41.7	61.7	26.0	na	53.1
MW-78A	2418.85	2416.19	2416.19	O	S-E	237741.82	791127.69	32.25840	101.41173	90.0	2.7	L. Gravel	2	PVC	68.7	74.7	26.0	6.0	71.6
MW-79	2439.07	2436.40	2436.21	O	S-E	237967.67	792296.12	32.25914	101.40798	80.0	2.9	U. Sand	2	PVC	53.9	73.9	40.0	na	73.1
MW-79A	2438.74	2436.07	2436.01	O	S-E	237965.10	792288.00	32.25913	101.40801	120.0	2.7	L. Gravel	2	PVC	93.7	113.7	40.0	19.0	103.1
MW-80	2443.30	2440.68	2440.55	K	S-E	238485.73	790471.29	32.26038	101.41395	130.0	2.8	U. Sand	2	PVC	63.8	83.8	18.0	na	72.7
MW-80A	2442.71	2439.91	2439.85	K	S-E	238541.72	790460.44	32.26053	101.41399	120.0	2.9	L. Gravel	2	PVC	80.9	110.9	18.0	28.0	101.6
RW-106	2442.67	2440.58	2440.41	K	S-E	240132.80	791443.67	32.26500	101.41100	85.0	2.3	U. Sand	6	PVC	52.3	87.3	44.9	0.0	79.3
MW-109	2370.71	2367.91	2367.68	O	S-E	236671.40	791458.77	32.25550	101.41053	40.0	3.0	U. Sand	2	PVC	6.0	25.0	16.0	na	13.0
MW-109A	2370.47	2367.71	2367.48	O	S-E	236684.80	791463.31	32.25553	101.41052	35.0	3.0	L. Gravel	2	PVC	17.0	27.0	16.0	4.0	23.0
RW-112	2387.48	2385.54	2385.54	O	S-E	237781.46	791370.45	32.25854	101.41095	60.0	1.9	U. Sand	6	PVC	21.94 41.9	36.9 46.9	17.0	4.0	45.0
MW-125	2440.98	2438.31	2438.08	J	S-W	238434.70	789189.30	32.26011	-101.41808	100.0	2.9	U. Sand	2	PVC	70.9	80.9	17.0	na	78.9
MW-125A	2440.81	2438.21	2437.98	J	S-W	238427.70	789195.30	32.26009	-101.41806	100.0	2.8	L. Gravel	2	PVC	72.8	92.8	17.0	4.0	88.8
RW-141	2406.25	2402.94	2402.71	O	S-W	237433.80	789813.30	32.25742	-101.41595	60.0	3.5	L. Gravel	6	PVC	34.5 59.5	54.5 64.5	17.0	4.0	57.0
RW-142	2436.69	2432.09	2431.86	O	S-E	237654.50	790806.90	32.25813	-101.41276	53.0	4.8	U. Sand	6	PVC	64.8 89.8	84.8 94.8	19.0	4.0	82.0
RW-144	2440.68	2438.49	2438.26	P	S-E	238215.70	793317.60	32.25993	-101.40471	120.0	2.4	U. Sand	6	PVC	64.4 89.4	84.4 99.4	12.0	15.0	85.0
RW-145	2431.88	2429.48	2429.25	P	S-E	238417.20	794203.30	32.26057	-101.40187	100.0	2.6	U. Sand	6	PVC	59.6 84.6	79.6 89.6	20.0	6.0	83.0
RW-146	2441.48	2438.09	2437.86	L	S-E	239131.00	794086.70	32.26252	-101.40234	100.0	3.6	U. Sand	6	PVC	69.6 99.6	94.6 104.6	26.0	6.0	97.1
RW-147	2448.40	2445.56	2445.33	L	S-E	239790.50	793936.20	32.26432	-101.40290	100.0	3.1	U. Sand	6	PVC	73.1 98.1	93.1 103.1	11.0	14.0	98.0

Attachment CP SAP-A: Key Well Information - Compliance Sampling

ID	ELEVATIONS			LOCATIONS						WELL COMPLETION					SCREEN		SAT. THICK.		SAMP
WELL NUMBER	Top of Casing (MSL)	Top of Pad (MSL)	Top of Grade (MSL)	MAP PANEL	LOC. AREA	Texas State Plane Coordinate Grid System NORTHING	EASTING	GPS Location Coordinate System LAT	LONG	Boring Depth (feet)	Riser Height (feet)	ZONE SCREEN (TMZ)	WELL MATERIAL (in.)	n/a	INTERVALS TOP (bTOC)	BOTTOM (bTOC)	Upper Sand (feet)	Lower Gravel (feet)	Pump Intake (ft-TOC)
IW-149	2440.17	2437.25	2437.02	L	C-E	239410.09	794536.76	32.26333	101.40091	120.0	3.2	U. Sand	2	PVC	62.2	82.2	25.0	na	73.1
IW-149A	2440.23	2437.24	2437.01	L	C-E	239422.04	794537.69	32.26337	101.40091	110.0	3.2	L. Gravel	2	PVC	88.2	100.7	25.0	11.0	92.2
IW-150	2394.79	2391.84	2391.61	P	C-E	236496.47	794259.34	32.25530	101.40146	60.0	3.2	U. Sand	2	PVC	30.2	40.2	10.0	na	39.4
IW-150A	2394.83	2391.84	2391.61	P	C-E	236473.16	794262.68	32.25524	101.40145	60.0	3.2	L. Gravel	2	PVC	41.2	51.2	10.0	10.0	45.2
MW-152	2475.86	2473.41	2473.21	F	S-W	242601.34	787822.22	32.27141	101.42301	115.0	2.7	U. Sand	2	PVC	80.7	100.7	29.0	na	88.0
MW-152A	2475.86	2473.40	2473.20	F	S-W	242600.51	787811.18	32.27141	101.42304	135.0	2.7	L. Gravel	2	PVC	108.7	118.7	29.0	8.0	113.6
MW-153	2456.19	2453.58	2453.38	F	S-W	242417.73	786548.60	32.27078	101.42710	90.0	2.8	U. Sand	2	PVC	59.8	79.8	20.0	na	73.8
MW-153A	2456.34	2453.85	2453.65	F	S-W	242415.04	786535.93	32.27077	101.42714	100.0	2.7	L. Gravel	2	PVC	79.7	89.7	20.0	8.0	85.7
MW-154	2451.56	2449.10	2448.90	J	S-W	240331.22	787129.99	32.26511	101.42497	120.0	2.7	U. Sand	2	PVC	67.7	87.7	28.0	na	74.6
MW-154A	2451.58	2449.11	2448.91	J	S-W	240341.22	787129.83	32.26513	101.42497	120.0	2.7	L. Gravel	2	PVC	94.7	104.7	28.0	8.0	99.6
MW-155	2455.65	2452.99	2452.70	I	C-E	240881.98	795495.39	32.26747	101.39799	97.0	3.0	U. Sand	2	PVC	71.0	91.0	29.0	na	82.9
MW-155A	2455.11	2452.45	2452.20	I	C-E	240881.11	795473.86	32.26747	101.39806	120.0	2.9	L. Gravel	2	PVC	99.9	109.9	29.0	8.0	104.9
MW-163	2399.90	2397.28	2394.45	J	S-W	239104.33	787460.07	32.26177	101.42375	60.0	5.5	U. Sand	2	PVC	19.5	39.5	27.0	na	29.6
MW-163A	2400.56	2397.81	2397.59	J	S-W	239413.61	787453.86	32.26262	101.42381	60.0	3.0	L. Gravel	2	PVC	45.0	55.0	27.0	6.0	47.9
MW-165R	2453.38	2453.67	2453.96	M	S-E	240782.41	797324.58	32.26723	-101.39195	120.0	2.9	U. Sand	2	PVC	69.0	89.0	33.0	na	85.0
MW-165AR	2453.46	2453.75	2453.81	M	S-E	240783.85	797337.75	32.26718	-101.39194	120.0	2.9	L. Gravel	2	PVC	103.0	113.0	33.0	5.0	110.0
MW-166	2442.20	2439.49	2439.29	M	S-E	238921.80	798006.59	32.26235	101.38964	100.0	2.9	U. Sand	2	PVC	70.9	90.9	25.0	na	80.9
MW-166A	2442.21	2439.52	2439.30	M	S-E	238913.44	798008.21	32.26232	101.38963	100.0	2.9	L. Gravel	2	PVC	92.9	97.9	25.0	1.0	93.9
RW-179	2434.75	2433.75	2433.50	H	C-E	240641.63	792300.07	32.26649	101.40829	80.0	1.3	U. Sand	8	PVC	44.3	74.3	28.0	0.0	55.5
RW-192	2461.05	2460.19	2459.94	K2	S-W	240501.52	789968.54	32.26586	101.41581	110.0	1.1	U. Sand	8	PVC	67.1	107.1	33.0	0.0	72.0
RW-194	2441.86	2443.89	2441.50	L	S-E	239498.85	794005.02	32.26352	101.40264	120.0	0.4	U. Sand	6	PVC	60.9 95.9	90.9 105.9	26.0	13.0	90.0
RW-195	2434.41	2432.42	2432.20	P	S-E	238360.17	793840.46	32.26038	101.40304	100.0	2.2	U. Sand	6	PVC	57.2 92.2	87.2 97.2	27.0	3.0	85.0
MW-214	2477.46	2474.70	2474.45	E	C-E	243573.40	793754.66	32.27469	101.40394	120.0	3.0	U. Sand	2	PVC	81.0	101.0	36.0	na	91.0
MW-214A	2477.59	2474.83	2474.58	E	C-E	243560.94	793756.82	32.27466	101.40393	130.0	3.0	L. Gravel	2	PVC	118.0	123.0	36.0	5.0	120.0
MW-215	2483.17	2480.44	2480.19	H	C-E	243253.32	795273.07	32.27397	101.39900	115.0	3.0	U. Sand	2	PVC	94.0	114.0	33.0	na	103.9
MW-215A	2483.42	2480.69	2480.44	H	C-E	243256.21	795286.98	32.27397	101.39895	130.0	3.0	L. Gravel	2	PVC	126.0	131.0	33.0	3.0	128.4
MW-218	2468.14	2465.09	2464.84	H	N-E	241950.87	794588.71	32.27032	101.40101	105.0	3.3	U. Sand	2	PVC	83.3	103.3	31.0	na	93.3
MW-218A	2467.84	2465.07	2464.82	H	N-E	241951.51	794600.30	32.27032	101.40105	103.0	3.0	L. Gravel	2	PVC	114.0	119.0	31.0	4.0	116.0
MW-220	2492.53	2489.69	2489.46	D	N-E	244721.80	792847.77	32.27775	101.40701	115.0	3.1	U. Sand	2	PVC	92.1	112.1	35.0	na	105.0
MW-220A	2492.95	2490.28	2490.05	D	N-E	244737.04	792839.00	32.27779	101.40704	140.0	2.9	L. Gravel	2	PVC	132.9	137.9	35.0	5.0	134.9
MW-221	2512.68	2509.72	2509.49	D	N-E	245810.86	791199.38	32.28057	101.41247	130.0	3.2	U. Sand	2	PVC	106.2	126.2	32.0	na	115.0
MW-221A	2512.56	2509.66	2509.43	D	N-E	245814.65	791214.79	32.28059	101.41243	160.0	3.1	L. Gravel	2	PVC	153.1	158.1	32.0	8.0	154.1
MW-223	2505.30	2502.40	2502.17	B	N-E	246138.03	792439.71	32.28160	101.40850	120.0	3.1	U. Sand	2	PVC	101.1	121.1	38.0	na	111.1
MW-223A	2506.46	2503.74	2503.51	B	N-E	246140.80	792455.55	32.28161	101.40845	150.0	2.9	L. Gravel	2	PVC	143.0	148.0	38.0	6.0	144.9
MW-224	2521.92	2519.03	2518.80	B	C-E	246794.51	792342.87	32.28339	101.40890	140.0	3.1	U. Sand	2	PVC	114.1	134.1	30.0	na	124.1
MW-224A	2521.54	2518.68	2518.45	B	C-E	246787.86	792356.74	32.28338	101.40885	160.0	3.1	L. Gravel	2	PVC	155.1	160.1	30.0	7.0	157.0

Attachment CP SAP-A: Key Well Information - Compliance Sampling

ID	ELEVATIONS			LOCATIONS						WELL COMPLETION					SCREEN		SAT. THICK.		SAMP
WELL NUMBER	Top of Casing (MSL)	Top of Pad (MSL)	Top of Grade (MSL)	MAP PANEL	LOC. AREA	Texas State Plane Coordinate Grid System NORTHING	EASTING	GPS Location Coordinate System LAT	LONG	Boring Depth (feet)	Riser Height (feet)	ZONE SCREEN (TMZ)	WELL MATERIAL (in.)	n/a	INTERVALS TOP (bTOC)	BOTTOM (bTOC)	Upper Sand (feet)	Lower Gravel (feet)	Pump Intake (ft-TOC)
MW-225	2476.92	2474.36	2474.13	C	C-W	243803.09	787714.58	32.27470	101.42350	100.0	2.8	U. Sand	2	PVC	79.8	99.8	27.0	na	90.2
MW-225A	2477.25	2474.42	2474.19	C	C-W	243815.77	787711.89	32.27474	101.42351	115.0	3.1	L. Gravel	2	PVC	108.1	113.1	27.0	5.0	110.0
MW-227	2486.14	2483.62	2483.39	C	C-W	245006.58	787568.89	32.27799	101.42412	110.0	2.8	U. Sand	2	PVC	81.8	101.8	34.0	na	97.6
MW-227A	2486.81	2484.01	2483.78	C	C-W	245019.43	787559.66	32.27803	101.42415	128.0	3.0	L. Gravel	2	PVC	122.0	127.0	34.0	7.0	124.0

Abbreviations: LAT - Latitude
LONG - Longitude
MSL - Mean Sea Level
in - Inch
bTOC - Depth Below Top of Well Casing
TMZ - Transmissive Monitored Zone

Attachment CP SAP-A: Monitoring Well Purging and Sampling Record

Alon USA, LP
Big Spring Refinery
Big Spring, Texas

Well: _____
Event: _____
Area: _____
Screen Interval (ft-BGS): _____ to _____

Hydrologic Monitoring - Houston, TX

Initials:

Well Inspection Information:

Date	Time	Depth to LNAPL (ft-TOC)	Depth to Water (ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (ft-TOC)	Sample Intake (ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secure	Label	Other	

Well Purging Record: ** Casing volume: 2-in casing = water column (Ft) x 0.163 gal/ft =_____gal; 4-in casing = water column (Ft) x 0.66 gal/ft =_____gal*

Date	Time	Volume Purged (Liters)	Cum. Vol. Purged (Gal)	pH (std units)	Temp (°C)	SC µmhos/cm)	Dissolved Oxygen (mg/L)	ORP (mV)	Turbidity (NTU)	Water Color / Clarity	Comments
		0.5									Standard groundwater sample:
		1.0									- dedicated pneumatic pump
		1.5									- recovery well sample port
		2.0									
		2.5									
		3.0									
		3.5									
		4.0									
		4.5									
		5.0									
		5.5									
		6.0									
		6.5									
		7.0									
		7.5									
		8.0									
		8.5									
		9.0									
		9.5									
		10									

Well Sampling Record:

Date	Time	Sample ID		pH (std units)	Temp (°C)	SC µmhos/cm)	Dissolved Oxygen (mg/L)	ORP (mV)	Turbidity (NTU)	Parameter	Preservative	Comments: Lab:

If LNAPL present, groundwater will not be sampled

CHAIN OF CUSTODY

SGS North America Inc. - Scott
500 Ambassador Caffery Parkway, Scott, LA 70583
TEL. 337.237.4775 FAX: 337.237.7838
www.sgs.com/ehsusa

PAGE ___ OF ___

FED-EX Tracking #	Bottle Order Control #
SGS Quote #	SGS Job #

Client / Reporting Information	Project Information	Billing Information (if different from Report to)
Company Name	Project Name:	
Street Address	Street	
City State Zip	City State	Company Name
Project Contact E-mail	Project #	Street Address
Phone #	Client Purchase Order #	City State Zip
Sampler(s) Name(s) Phone #	Project Manager	Attention:

Requested Analysis (see TEST CODE sheet)

Matrix Codes

DW - Drinking Water
GW - Ground Water
WW - Water
SW - Surface Water
SO - Soil
SL- Sludge
SED-Sediment
OI - Oil
LIQ - Other Liquid
AIR - Air
SOL - Other Solid
WP - Wipe
FB - Field Blank
EB-Equipment Blank
RB - Rinse Blank
TB - Trip Blank

SGS Sample #	Field ID / Point of Collection	Collection: Comp/Grab	Collection: Date	Collection: Time	Collection: Sampled By	Matrix	# 0f bottles	Number of preserved Bottles: HCl	NaOH	ZA/NaOH	HNO3	H2SO4	NONE	DI Water	MEOH	TSP	NaHSO4	ENCORE	LAB USE ONLY

Turnaround Time (Business days)

- ☐ **Standard 10 Business Days**
- ☐ **5 Business Days RUSH**
- ☐ **4 Business Days RUSH**
- ☐ **3 Business Days RUSH**
- ☐ **2 Business Days RUSH**
- ☐ **1 Business Day EMERGENCY**
- ☐ **Other** _____

Approved By (SGS PM): / Date:

_____
_____
_____
_____
_____
_____

Emergency & Rush T/A data available via Lablink. Approval needed for RUSH/Emergency TAT

Data Deliverable Information

- ☐ **Commercial "A" (Level 1)**
- ☐ **Commercial "B" (Level 2)**
- ☐ **FULLT1 (Level 3+4)**
- ☐ **REDT1 (Level3+$)**
- ☐ **Commercial "C"**
- ☐ **TRRP**
- ☐ **RECAP**
- ☐ **State Forms**
- ☐ **EDD Format**
- ☐ **Other** _____

Commercial "A" = Results Only,
Commercial "B" = Results + QC Summary
Commercial "C" = Results + QC Summary + Partial Raw Data

Comments / Special Instructions

Note: Sample inventory is verified upon receipt in the Laboratory

Sample Custody must be documented below each time samples change possession, including courier delivery.

Relinquished by Sampler: 1	**Date / Time:**	**Received By:** 1	**Relinquished By:** 2	**Date / Time:**	**Received By:** 2
Relinquished by Sampler: 3	**Date / Time:**	**Received By:** 3	**Relinquished By:** 4	**Date / Time:**	**Received By:** 4
Relinquished by: 5	**Date / Time:**	**Received By:** 5	**Custody Seal #** ☐ Intact ☐ Not intact ☐ Absent	**Preserved where applicable** ☐	**On Ice** ☐ **Cooler Temp.** Therm ID:

Attachment CP SAP-A

Water Quality Meter Calibration Log

Client: Alon USA, LP
Facility Big Spring Refinery
Proj. No. _____

Sampling Event: _____
Year: _____
Sampler: _____

Parameter Zeros					
pH	mS/cm	NTU	mg/L DO	% DO	m

Horiba U-50			
		☐ YES ☐ NO	☐ YES ☐ NO
Serial No.	Calibration Solution	Auto Calibrate:	Manual Calibrate:

Calibration Measurements			
Date:			
pH:			
mS/cm			
NTU			
mg/L DO			
% DO			
m			

NOTES:

Attachment CP SAP-A - Tailgate Safety Meeting Form

Site Name & Number: _____

Atlas Project Number: _____

Work Being Performed: _____

Date & Time of Meeting: _____

Name of Presenter: _____

NOTE: On the initial day of the project, the Project Manager or designee should conduct a visual inspection of the project site prior to the Tailgate Safety Meeting. This inspection should include a review of project site equipment, hazards, specific job tasks, activities or operations to be performed for that day. These specific items must be covered during the Tailgate Safety Meeting. For subsequent days, any changes to the site or operations must be covered in the Tailgate Safety Meeting. In addition, "Task-Specific" Job Safety Analysis (JSA) for the tasks/activities at the project site must be integrated into the HASP and Tailgate discussions. Tailgate Meetings should be performed each day. Employees, client representatives and subcontractors must review the Tailgate Safety Meeting, be briefed on the topics and acknowledge the HSE topics by signing this form. Individuals not fluent in the English language must have the site's health safety and environmental requirements translated to them.

Itemize the Specific Topics Discussed (if more space is needed use the back of this page):

☐ Emergency Evacuation area(s) ☐ Eye Wash / First Aid Kit / Fire Extinguisher ☐ HASP Location ☐ Hospital Route

5 KEY SAFETY CONCEPTS -

☐ **How is everyone feeling?** (Get a response) **Is everyone Rested & Mentally alert?** FOCUS IS KEY to staying injury free.

N/A Watch out for & Coach your Coworkers (COMMUNICATE HAZARDS when recognized).

☐ **No Improvising** – Use the proper tool for the job (Stop and Discuss ANY variance with Atlas)

☐ **No Willful Unsafe Acts** – Enjoy the day, but no horseplay or anything unsafe.

☐ **Everyone has STOP WORK authority** – USE IT whenever people aren't focused, for all near-misses and hazards.

☐ PPE is required at all times within Exclusion zone (Set the example, call out non-compliance/stop work). ☐ Proper PPE? (check)

☐ 50 lbs. or awkward, get lifting help. ☐ Eating, Drinking and use of Cell Phones in Designated Area Only.

N/A Spotters Needed for Backing Equipment. ☐ We will follow the Safe Work Plan for the work and initial each page. Major changes will need official approvals through Mark Wallinga and Jenn Williams. ☐ Use 3 part communication as we work today

☐ Caution crossing street (Use crosswalks - HAZARDS ARE HIGH). ☐ Today's Weather _____, Drink Fluids!

☐ Caution dealing with public (Irate/unstable pedestrians, customers, locals. Be aware, be courteous, don't antagonize).

☐ Keep Emotions in check. Communicate, Take Breaks when stressed, pushed, tired, not focused! (5 minute break or job shut down?)

☐ Maintain Housekeeping ☐ No FOBKs (**What else? Are there other items we haven't considered?)**

N/A Subcontractor – Discuss scope of work, JSA, Daily Tasks (What are we doing? What are the Hazards? What could go wrong?)

☐ JSA Reviewed? ☐ Changes to task? Get approval first. Use the GO-CARD. Contact supervisor if solutions are clear.

☐ Headcount? 1 (First time employees onsite [Sign HASP, PPE check, discuss site specifics and client expectations]).

☐ Any Shared Learning? (Site's SIRs/Hazards) ☐ Equipment Inspections ☐ Communication & Focus is Key.

☐ Everyone needs to sign the following documents: HASP, JSA and Tailgate Safety Meeting Form. ☐ Recognition to employees –if you see something, say something!

❑ **Client Requirements** - By checking the box to the left, the presenter of the Tailgate Meeting acknowledges that all client-specific requirements have been completed for both Atlas and Subcontractor employees.

***List the JSAs reviewed below. *What extra hazards are present on this site on this day?**

JSA:			
See next page			

***Continued on next page.*

Tailgate Safety Meeting Form (Pg. 2)

JSAs Reviewed and Modification Documentation (If modification not required please note):

☐ Driving
☐ Field Work Observations and Note Taking
☐ Moving Around a Refinery Complex

☐ _____

☐ _____

☐ _____

SPECIAL ISSUES TO BE COGNIZANT OF:

☐ Back country areas you should not try to drive to or through.

☐ Moving through rough terrain on foot.

☐ Rattlesnakes – preventative actions, response.

☐ How to insure that gates do not get locked behind you late in the day.

☐ Client communication radio protocol.

☐ Facility arrival & departure client notification protocol.

***By signing this Tailgate Safety Meeting form, you are acknowledging that you have read, reviewed and understand the health and safety topics discussed on this form.**

Daily Safety Tailgate Meeting Participants (Use the back of this form if needed)			
Print Name	**Signature**	**Company**	**Date**

***Tailgate Presenter must sign below that all information above was covered with all personnel on site.**

Print Name	Signature	Company	Date

Alon USA, LP
Alon USA Big Spring Refinery

Hazardous Waste Permit 50140
Part B Application
SWR No. 30083 / RN100250869 / CN600881783

APPENDIX XI
SITE SPECIFIC TABLES

Table XI.A.1. - Facility History for Waste Management Units

Name of Waste Management Unit(1)	Type of Waste Management Unit	Notice of Registration Unit Number	Date Waste Was *First* Placed in Unit	EPA Waste Code	Estimated Capacity of Unit	Quantity of Waste Left in Place	Date Waste Was Last Placed in Unit(2)	Date of Unit Closure Or Projected Closure	Date Unit Certified Closed(3)	Is There Evidence of a Release of Hazardous Constituent(s)(4) to Groundwater? (Yes, No, or Unknown)
CSA-A	Container Storage Area	001	1/1/1980	D001 D002 D003 D006 D007 D008 D009 D011 D018 F003 F005 F037 K050 K051 K171	160 DRUMS	NA	NA	Active, Unkno	NA	No
CSA-B	Container Storage Area	020	1/1/1980	D001 D002 D003 D006 D007 D008 D009 D011 D018 F003 F005 F037 K050 K051 K171	160 DRUMS	NA	NA	Active, Unkno	NA	No

Name of Waste Management Unit[1]	Type of Waste Management Unit	Notice of Registration Unit Number	Date Waste Was *First* Placed in Unit	EPA Waste Code	Estimated Capacity of Unit	Quantity of Waste Left in Place	Date Waste Was Last Placed in Unit[2]	Date of Unit Closure Or Projected Closure	Date Unit Certified Closed[3]	Is There Evidence of a Release of Hazardous Constituent(s)[4] to Groundwater? (Yes, No, or Unknown)
CSA-C [ACTIVE]	Container Storage Area	021	1/1/1980	D001 D002 D003 D006 D007 D008 D009 D011 D018 F003 F005 F037 L050 K051 K171	80 DRUMS	NA	NA	Active, Unkno	NA	No
SITE E [CLOSED]	Land Treatment Unit	005	1/1/1976	D001 D002 F037	None (closed)	~172,500 tons	1/1/1990	1/1/1995	08/14/1996	No
SITE H [CLOSED]	Land Treatment Unit	010	1/1/1989	D001 D002 D018 F037 K051 K169	None (closed)	~61,250 tons	1/1/1994	1/1/2004	06/09/2004	No
BICA AREA [ACTIVE]	LNAPL Plume	NA	NA	NA	NA	Jan 2024 121,162 bbls	NA	Active, Unkno	NA	Yes

1 Indicate by asterisk (*) those waste management units that have received any hazardous waste constituent listed in Appendix VIII of 40 CFR Part 261.
2 For the purposes of this Compliance Plan Application, a waste management unit receiving hazardous waste after July 26, 1982 shall be considered a Regulated Unit. A waste management unit that ceased receiving hazardous waste on or before that date shall be considered a Solid Waste Management Unit (SWMU).
3 Date the applicant submitted certification of closure to the Commission.
4 Hazardous constituents are those hazardous constituents listed in Appendix IX of 40 CFR Part 264.

CP Table I - Waste Management Units and Areas Subject to Groundwater Corrective Action and Compliance Monitoring

A. Corrective Action[1] (30 TAC Section 335.166)

Unit Name	Notice of Registration (NOR) Number, if applicable	Date Program Requirement and Remedy Standard Completed[4]

B. Compliance Monitoring[1] (30 TAC Section 335.165)

Unit Name	Notice of Registration (NOR) Number, if applicable	Date Program Requirement and Remedy Standard Completed[4]
Site E	005	On-Going

C. Corrective Action[2] (30 TAC Section 335.167)

Unit Name	Notice of Registration (NOR) Number, if applicable	Date Program Requirement and Remedy Standard Completed[4]
BICA Area	n/a	On-Going

D. Alternative Corrective Action[3] (30 TAC Section 335.151)

Unit Name	Notice of Registration (NOR) Number, if applicable	Date Program Requirement and Remedy Standard Completed[4]

E. Facility Operations Area (FOA)[4] (30 TAC Section 335.156 and Chapter 350)

Unit Name	Notice of Registration (NOR) Number, if applicable	Date Program Requirement and Remedy Standard Completed[4]

Foot Note:

1. Program applies to RCRA-regulated units only.

2. Program applies to releases from solid waste management units (SWMUs) and/or areas of concern (AOCs).
3. Program applies to commingled releases from RCRA-regulated unit and from one or more SWMUs and/or AOCs.
4. List SWMUs, additional units/areas of Investigation, AOCs, RCRA-regulated units within the FOA that are subject to corrective action. For RCRA units, SWMUs and/ or AOC outside the FOA boundary for which compliance monitoring and/ or corrective action applies should be listed separately in Items A, B or C as appropriate.

5. For the purpose of maintaining a historical record to verify the units/areas have met the program requirements in accordance with Permit Provisions XI.A.2, XI.A.3., XI.A.4. and/or XI.A.5., the permittee shall update CP Table I to reflect the new status of the unit/area to include the remedy standard achieved for all media of concern and the date of the Commission's No Further Action (NFA) approval letter. The units/area shall not be deleted from CP Table I until the program objectives have been completed and no further action has been approved through modification or amendment to the Permit.

CP Table II: Solid Waste Management Units and/or Areas of Concern Addressed in Permit Section XI.H. for which Corrective Action Applies Pursuant to 30 TAC Section 335.167

Unit Name	NOR Number, if applicable	SWMU or AOC	Affected Media[1]	Date Program Requirement and Remedy Standard Completed[2]
BICA AREA	NA	SWMU	GW	ACTIVE REMEDIATION
Site E	005	SWMU	GW, SOILS	GW Active Remediation Soils RACR Approved July 1995
Site H	010	SWMU	GW, SOILS	In Post-Closure Care
WP-4A	NA	SWMU	SOILS	NFA May 30, 2007
WP-5	NA	SWMU	SOILS	NFA May 30, 2007
WP-7	NA	SWMU	SOILS	NFA July 26, 1995
WP-8	NA	SWMU	SOILS	NFA February 2, 2001
WP-9	NA	SWMU	SOILS	NFA February 2, 2001
WP-16	NA	SWMU	SOILS	NFA February 2, 2001
WP-17	NA	SWMU	SOILS	NFA February 2, 2001
WP-18	NA	SWMU	SOILS	NFA February 2, 2001
WP-19	NA	SWMU	SOILS	NFA February 2, 2001
WP-20	NA	SWMU	SOILS	NFA July 8, 2005
WP-26	NA	SWMU	SOILS	NFA January 29, 2002
A1	NA	SWMU	SOILS	NFA May 30, 2007
Lead Area	NA	SWMU	SOILS	NFA July 23, 2003
W-3	NA	SWMU	SOILS	NFA April 11, 2005
W-4	NA	SWMU	SOILS	NFA February 2, 2001

SWMU= Solid Waste Management Units

AOC= Area of Concern

Foot Note:

1. Specify the affected media [i.e. soil, groundwater (GW), surface water (SW), sediment (SED)].
2. For each SWMU or AOC, specify the Remedy Standard that was completed and the date of the Commission's No Further Action (NFA) letter for the media of concern.
3. For sites with FOA authorization, list the SWMUs and/or AOCs that are subject to corrective action at the site. Please separate the SWMUs and/or AOCs that are located within the FOA boundary from the SWMUs and/or AOCs that are located outside of the FOA boundary.

Note:

CP Table II lists SWMUs and/or AOCs which have been identified in the RCRA Facility Assessment (RFA) Report as having a release(s) or a potential release(s) of hazardous waste, hazardous constituents, or other constituents of concern. The permittee is thus required to meet Corrective Action Objectives for the SWMUs and/or AOCs in accordance with Permit Section XI.H. and 30 TAC Section 335.167.

The permittee shall update CP Table II when a new SWMU and/or AOC that requires corrective action is identified. The permittee shall also update CP Table II as outlined in Footnote 2 when the corrective action status of a media for a SWMU or AOC has changed.

SWMUs and/or AOCs shall not be deleted from this table when the Corrective Action Objectives have been completed and a No Further Action (NFA) determination has been approved for the SWMU and/or AOC. In accordance with Permit Section XI.H., CP Table II is intended to be a historical record of the facility's corrective actions and to reflect when the Corrective Action Objectives have been met for each SWMU/AOC.

There may be cases in which the permittee fulfills the Corrective Action Objectives for soils at a SWMU/AOC, but long-term groundwater monitoring and corrective action may be necessary to meet the groundwater Corrective Action Objectives. In such instances, the SWMU/AOC would be listed in CP Table I, Item C, and would be subject to all applicable provisions of this Compliance Plan. If a release from a SWMU/AOC is commingled with a RCRA-regulated unit, then the unit and the SWMU/AOC would be listed in CP Table I, Item D. In accordance with Permit Section XI.H., once the Corrective Action Objectives for groundwater are completed, the permittee shall modify or amend the Compliance Plan to reassign the SWMU/AOC in CP Table I, Item C or Item D, to CP Table II. CP Table II should reflect the new status of the SWMU/AOC. It should include the Remedy Standard achieved for all media of concern and the date of the Commission's NFA approval letter for each SWMU/AOC.

CP Table III: Corrective Action Program Table of Detected Hazardous and Solid Waste Constituents and the Groundwater Protection Standard

Unit Name	**Column A** Hazardous Constituents	**Column B** Groundwater Protection Standards (mg/l) at the POC [2]		**Column C** Groundwater Protection Standards (mg/l) at the POE or APOE, or FBOC[1,2]	
BICA Area	Benzene	0.5	GW GW Class 3	0.5	GW GW Class 3
	1,2-Dichloroethane	0.5	GW GW Class 3	0.5	GW GW Class 3
	Arsenic	1.0	GW GW Class 3	1.0	GW GW Class 3
	parameter	0.00		0.00	
	parameter	0.00		0.00	
	parameter	0.00		0.00	

Notes:

a) If the Corrective Action Program (Provision XI.E.) does not apply to the RCRA-regulated units, SWMUs, or AOCs at the facility, mark "Reserved" next to the CP Table III heading.

b) CP Table III represents the long list of hazardous constituents that are reasonably expected to be in, or derived from, the waste placed in each RCRA-regulated unit, SWMU, and/or AOC listed in the table. CP Table III also lists the hazardous constituents that have been historically detected in the groundwater for each RCRA-regulated unit, SWMU, and/or AOC. These hazardous constituents are monitored in accordance with Provision XI.F.3.c.(1).

c) In accordance with Provision XI.D.6., the Groundwater Protection Standards (GWPS) must be met before the RCRA-regulated unit, SWMU, and/or AOC can exit the Corrective Action Program.

d) If applicable, "Appendix IX" can be used in Column A for a unit instead of listing each chemical of concern (COC). The permittee may petition the Executive Director for the deletion of a specific COC from the Appendix IX analysis if the permittee can demonstrate that the COC was never used in the facility's operations nor was disposed of in the waste management area.

e) Attenuation monitoring point (AMP) wells, corrective action system (CAS) wells, and corrective action observation (CAO) wells should not be listed in CP Table III. These wells should only be depicted in the CP Attachment A maps. Once an AMP, CAS, or CAO well meets its respective attenuation action levels (AALs) or GWPS, then the Permittee may propose to discontinue monitoring that well without modification to the Permit. If the AMP, CAS, or CAO well is listed in CP Table III, then any proposed change to the well would require modification to the Permit. Changes to the wells depicted in the CP Attachment A maps can be approved in the Groundwater Monitoring Report required by CP Table VII and become a part of the Permit by reference.

Footnotes:

1. Use Column C to specify the GWPS assigned at a POE or APOE (i.e. for sites with MNA or PMZ proposals as applicable under TRRP), or FBOC for those sites with FOA authorization. Put "N/A" if a specific program or column item is not applicable.
2. For each COC, select the appropriate GWPS designation and definition to demonstrate that the corrective action program objectives are being achieved either under the Risk Reduction Rules (RRR) pursuant to 30 TAC Chapter 335 or the Texas Risk Reduction Program (TRRP) pursuant to 30 TAC Chapter 350. The RRR and TRRP GWPS designations and definitions may not be combined pursuant to 30 TAC Section 350.2(m).

CP Table IIIA: Corrective Action Program Table of Indicator Parameters and the Groundwater Protection Standard

Unit Name	**Column A** Hazardous Constituents	**Column B** Groundwater Protection Standards (mg/l) at POC [2]		**Column C** Groundwater Protection Standards (mg/l) at the POE or APOE, or FBOC[1,2]	
BICA AREA	Benzene	0.5	GW GW Class 3	0.5	GW GW Class 3
	1,2-Dichloroethane	0.5	GW GW Class 3	0.5	GW GW Class 3

Notes:

a) If the Corrective Action Program (Provision XI.E.) does not apply to the RCRA-regulated units, SWMUs, or AOCs at the facility, mark "Reserved" next to the CP Table III heading.

b) CP Table III represents the long list of hazardous constituents that are reasonably expected to be in, or derived from, the waste placed in each RCRA-regulated unit, SWMU, and/or AOC listed in the table. CP Table III also lists the hazardous constituents that have been historically detected in the groundwater for each RCRA-regulated unit, SWMU, and/or AOC. These hazardous constituents are monitored in accordance with Provision XI.F.3.c.(1).

c) In accordance with Provision XI.D.6., the Groundwater Protection Standards (GWPS) must be met before the RCRA-regulated unit, SWMU, and/or AOC can exit the Corrective Action Program.

d) If applicable, "Appendix IX" can be used in Column A for a unit instead of listing each chemical of concern (COC). The permittee may petition the Executive Director for the deletion of a specific COC from the Appendix IX analysis if the permittee can demonstrate that the COC was never used in the facility's operations nor was disposed of in the waste management area.

e) Attenuation monitoring point (AMP) wells, corrective action system (CAS) wells, and corrective action observation (CAO) wells should not be listed in CP Table III. These wells should only be depicted in the CP Attachment A maps. Once an AMP, CAS, or CAO well meets its respective attenuation action levels (AALs) or GWPS, then the Permittee may propose to discontinue monitoring that well without modification to the Permit. If the AMP, CAS, or CAO well is listed in CP Table III, then any proposed change to the well would require modification to the Permit. Changes to the wells depicted in the CP Attachment A maps can be approved in the Groundwater Monitoring Report required by CP Table VII and become a part of the Permit by reference.

Footnotes:

1. Use Column C to specify the GWPS assigned at a POE or APOE (i.e. for sites with MNA or PMZ proposals as applicable under TRRP), or FBOC for those sites with FOA authorization.

   Put "N/A" if a specific program or column item is not applicable.

2. For each COC, select the appropriate GWPS designation and definition to demonstrate that the

corrective action program objectives are being achieved either under the Risk Reduction Rules (RRR) pursuant to 30 TAC Chapter 335 or the Texas Risk Reduction Program (TRRP) pursuant to 30 TAC Chapter 350. The RRR and TRRP GWPS designations and definitions may not be combined pursuant to 30 TAC Section 350.2(m).

ACL = alternative concentration limit; PQL = practical quantitation limit; PCL = protective concentration level; RSA = Remedy Standard A; RSB = Remedy Standard B

CP Table IV: Compliance Monitoring Program Table of Hazardous and Solid Waste Constituents and Quantitation Limits

Unit Name	Column A Hazardous Constituents[2]	Column B Concentration Limits (mg/l)[1]	
SITE E	Acetone	2200	GWGWClass3
	Benzene	0.05	GWGWClass3
	Methyl Ethyl Ketone	1500	GWGWClass3
	Carbon disulfide	240	GWGWClass3
	Ethylbenzene	70	GWGWClass3
	Toluene	100	GWGWClass3
	Xylenes, total	1000	GWGWClass3
	Benzenethiol	0.24	GWGWClass3
	2,4-Dimethylphenol	0.049	GWGWClass3
	Cresols, total	120	GWGWClass3
	Phenol	730	GWGWClass3
	Diethyl phthalate	2000	GWGWClass3
	1-Methylnaphthalene	3.1	GWGWClass3
	2-Methylnaphthalene	9.8	GWGWClass3
	Naphthalene	49	GWGWClass3
	Pentachlorophenol	0.1	GWGWClass3
	Pyridene	2.4	GWGWClass3
	Arsenic	1.0	GWGWClass3
	Beryllium	0.4	GWGWClass3
	Nickel	49	GWGWClass3
	Selenium	5.0	GWGWClass3
	Vanadium	4.4	GWGWClass3
		Add Row	

Notes:

a) If there are no RCRA-regulated units subject to the Compliance Monitoring Program , mark “Reserved” next to the CP Table IV heading.

b) CP Table IV represents the long list of hazardous constituents that are reasonably expected to be in, or derived from, waste placed in a RCRA-regulated unit, but may not be detected in groundwater above the constituents' respective quantitation limits.

c) CP Table IV constituents are to be monitored annually in accordance with Provision XI.F.3.(2). Any CP Table IV constituents detected in the groundwater should be carried over to CP Table IVA.

Footnotes:

1) For each constituent of concern, select the appropriate quantitation limit designation and definition according to either the Risk Reduction Rules (RRR) pursuant to 30 TAC Chapter 335 or the Texas Risk Reduction Program (TRRP) pursuant to 30 TAC Chapter 350.
2) If applicable, "Appendix IX" can be used in Column A for a unit instead of listing each chemical of concern (COC). The permittee may petition the Executive Director for the deletion of a specific COC from the Appendix IX analysis if the permittee can demonstrate that the COC was never used in the facility's operations nor was disposed of in the waste management area.

TRRP Quantitation Limit Designations and Definitions

ND Non-detectable at the method quantitation limit (MQL) as determined by the analytical methods of the most recent edition of EPA SW-846 and as listed in the July 8, 1987 edition of the Federal Register and later editions. MQL is indicated in parentheses. MQL is defined in 30 TAC Section 350.4(a)(54) as the lowest non-zero concentration standard in the laboratory's initial calibration curve and is based on the final volume of extract (or sample) used by the laboratory.

BKG Background as determined in accordance with Provision XI.F.1.

CP Table IVA: Compliance Monitoring Program Table of Detected Hazardous Constituents and the Groundwater Protection Standard

Unit Name	Column A Hazardous Constituents	Column B Concentration Limits (mg/l)	
SITE E	Benzene	0.5	GWGWClass3
	Benzenethiol	2.4	GWGWClass3
	Toluene	100	GWGWClass3
	Ethylbenzene	70	GWGWClass3
	Xylenes, total	1000	GWGWClass3
		Add Row	

Notes:

a) If there are no RCRA-regulated units subject to the Compliance Monitoring Program (Provision ?), mark "Reserved" next to the CP Table IVA heading.

b) CP Table IVA represents the short list of hazardous constituents detected in groundwater above the quantitation limits specified in CP Table IV.

c) CP Table IVA constituents are monitored semiannually in accordance with Provision XI.F.3.c.(2) to verify that the groundwater protection standards (GWPS) are being met.

Footnotes:

1. Use Column C, specify the GWPS assigned at a POE or APOE (i.e. as applicable under TRRP). (i.e. modify Table and Footnotes to support the establishment of GWPS at POC, POE or APOE monitoring points, as appropriate). Put "N/A" if a specific program or column item is not applicable.
2. For each constituent of concern (COC), select the appropriate GWPS designation and definition to demonstrate that the compliance monitoring program objectives are being achieved either under the Risk Reduction Rules (RRR) pursuant to 30 TAC Chapter 335 or the Texas Risk Reduction Program (TRRP) pursuant to 30 TAC Chapter 350. The RRR and TRRP GWPS designations and definitions may not be combined pursuant to 30 TAC Section 350.2(m). Delete all designations and definitions that are not applicable.

   ACL = alternative concentration limit; PQL = practical quantitation limit; PCL = protective concentration level; RSA = Remedy Standard A; RSB = Remedy Standard B

CP Table V: Designation of Wells

Point of Compliance Wells
Unit Name: BICA AREA
Well Numbers: MW-78, MW-78A, MW-79, MW-79A, MW-80, MW-80A, MW-109, MW-109A, MW-125, MW-125A, IW-149, IW-149A, IW-150, IW-150A, MW-152, MW-152A, MW-153, MW-153A, MW-154, MW-154A, MW-155, MW-155A, MW-214, MW-214A, MW-218, MW-218A, MW-220, MW-220A, MW-221, MW-221A, MW-223, MW-223A, MW-224, MW-224A, MW-225, MW-225A, MW-227, MW-227A
Point of Exposure Wells
Unit Name: NONE
Well Numbers: NONE
Alternate Point of Exposure Wells
Unit Name: NONE
Well Numbers: NONE
Background Wells
Unit Name: BICA AREA
Well Numbers:MW-52, MW-52A, MW-76, MW-76A
FOA Boundary of Compliance Wells
Exposure Pathway: NONE
Unit Name: NONE
Well Numbers:NONE

Wells that are not listed in this table, but are required by Permit Section XI.B.2 (e.g. AMP wells, CAO wells, etc.,) and depicted only in CP Attachment A are subject to change, upon approval by the Executive Director, without modification to the Compliance Plan.

CP Table V: Designation of Wells

Point of Compliance Wells
Unit Name: SITE E
Well Numbers: MW-39, MW-39A, MW-40, MW-40A, MW-41, MW-41A
Point of Exposure Wells
Unit Name: NONE
Well Numbers: NONE
Alternate Point of Exposure Wells
Unit Name: NONE
Well Numbers: NONE
Background Wells
Unit Name: SITE E
Well Numbers: MW-38, MW-38A
FOA Boundary of Compliance Wells
Exposure Pathway: NONE
Unit Name: NONE
Well Numbers: NONE

Wells that are not listed in this table, but are required by Permit Section XI.B.2 (e.g. AMP wells, CAO wells, etc.,) and depicted only in CP Attachment A are subject to change, upon approval by the Executive Director, without modification to the Compliance Plan.

CP Table VI: Compliance Period for RCRA-Regulated Units

SITE E	Year or Number of Years
Year Waste Management Activities Initiated	1976
Year Closed	1995
Compliance Period (years)	1995 – 1976 = 19 years
Compliance Period Began	1995
Remove Last Unit	Add Unit

CP Table VII: Reporting Requirements

Item	Program	Reporting Frequency	Requirements
1.	All programs	SA - Jan 21 & Jul 21	Each report shall be certified by a qualified engineer and/or geoscientist.
2.	Corrective Action and/or Compliance Monitoring	SA - Jan 21 & Jul 21	A table of all modifications and amendments made to this Compliance Plan with their corresponding approval dates by the Executive Director or the Commission and a brief description of each action;
3.	Corrective Action and/or Compliance Monitoring	SA - Jan 21 & Jul 21	A summary of any activity within an area subject to institutional control.
4.	Corrective Action and/or Compliance Monitoring	SA - Jan 21 & Jul 21	Tabulation of well casing elevations in accordance with CP Attachment C;
5.	Corrective Action and/or Compliance Monitoring	SA - Jan 21 & Jul 21	Certification and well installation diagram for any new well installation or replacement and certification for any well plugging and abandonment;
6.	Corrective Action and/or Compliance Monitoring	SA - Jan 21 & Jul 21	Recommendation for any changes to the program;
7.	Corrective Action and/or Compliance Monitoring	SA - Jan 21 & Jul 21	Any other items requested by the Executive Director;
8.	Corrective Action and/or Compliance Monitoring	SA - Jan 21 & Jul 21	Water table maps shall be prepared from the groundwater data collected pursuant to Permit Provision XI.G. and shall be evaluated by the permittee with regard to the following parameters: a. Development and maintenance of a cone of depression during operation of the system; b. Direction and gradient of groundwater flow; c. Effectiveness of hydrodynamic control of the contaminated zone during operation; and d. Estimation of the rate and direction of groundwater contamination migration.

Item	Program	Reporting Frequency	Requirements
9.	Corrective Action and/or Compliance Monitoring	SA - Jan 21 & Jul 21	The permittee shall submit a report to each recipient listed in Provision XI.J.3., which includes the all applicable information listed in this table (CP Table VII: Reporting Requirements), determined since the previously submitted report, if those items are applicable. If both Corrective Action and Compliance Monitoring Programs are authorized, then the Groundwater Monitoring Report required by CP Table VII shall contain information required for both programs.
10.	Corrective Action and/or Compliance Monitoring	SA - Jan 21 & Jul 21	The Corrective Action System(s) authorized under Provision XI.B.3. in operation during the reporting period and a narrative summary of the evaluations made in accordance with Permit Sections XI.E., XI.F., and XI.G. for the preceding reporting period. The reporting periods shall be January 1 through June 30 and July 1 through December 31 for Corrective Action Monitoring, unless an alternative semiannual schedule is approved by the Commission. The period for Compliance Monitoring shall be based on the calendar year.
11.	Corrective Action and/or Compliance Monitoring	SA - Jan 21 & Jul 21	The method(s) utilized for management of recovered/purged groundwater shall be identified in accordance with Provision XI.B.8. The permittee shall maintain this list as part of the facility operating record and make it available for inspection upon request.

Item	Program	Reporting Frequency	Requirements
12.	Corrective Action and/or Compliance Monitoring	SA - Jan 21 & Jul 21	An updated table and map of all monitoring and corrective action system wells. The wells to be sampled shall be those wells proposed in the Compliance Plan Application referenced in Provision I.B. and any changes subsequently approved by the Executive Director pursuant to Provision XI.B.3. Provide in chronological order, a list of those wells which have been added to, or deleted from, the groundwater monitoring and remediation systems since original issuance of the Compliance Plan. Include the date of the Commission's approval for each entry;
13.	Corrective Action and/or Compliance Monitoring	SA - Jan 21 & Jul 21	The results of the chemical analyses, submitted in a tabulated format acceptable to the Executive Director which clearly indicates each parameter that exceeds the Groundwater Protection Standard (GWPS). Copies of the original laboratory report for chemical analyses showing detection limits and quality control and quality assurance data shall be provided if requested by the Executive Director;
14.	Corrective Action and/or Compliance Monitoring	SA - Jan 21 & Jul 21	Tabulation of all water level elevations required in Provision XI.F.3.d.(1), depth to water measurements, and total depth of well measurements collected since the data that was submitted in the previous monitoring report;
15.	Corrective Action and/or Compliance Monitoring	SA - Jan 21 & Jul 21	Potentiometric surface maps showing the elevation of the water table at the time of sampling, delineation of the radius of influence of the Corrective Action System, and the direction of groundwater flow gradients outside any radius of influence;
16.	Corrective Action and/or Compliance Monitoring	SA - Jan 21 & Jul 21	Tabulation of all data evaluation results pursuant to Provision XI.F.4. and status of each well with regard to compliance with the Corrective Action objectives and compliance with the GWPS;
17.	Corrective Action and/or Compliance Monitoring	SA - Jan 21 & Jul 21	An updated summary as required by CP Table VIII;

Item	Program	Reporting Frequency	Requirements
18.	Corrective Action and/or Compliance Monitoring	SA - Jan 21 & Jul 21	Summary of any changes made to the monitoring/ corrective action program and a summary of well inspections, repairs, and any operational difficulties;
19.	Corrective Action and/or Compliance Monitoring	SA - Jan 21 & Jul 21	A notation of the presence or absence of non-aqueous phase liquids (NAPLs), both light and dense phases, in each well during each sampling event since the last event covered in the previous monitoring report and tabulation of depth and thickness of NAPLs, if detected;
20.	Corrective Action only	SA - Jan 21 & Jul 21	Quarterly tabulations of quantities of recovered groundwater and NAPLs, and graphs of monthly recorded flow rates versus time for the Recovery Wells during each reporting period. A narrative summary describing and evaluating the NAPL recovery program shall also be submitted;
21.	Corrective Action only	SA - Jan 21 & Jul 21	Tabulation of the total contaminant mass recovered from each recovery system for each reporting period;
22.	Corrective Action only	SA - Jan 21 & Jul 21	Maps of the contaminated area where GWPSs are exceeded depicting concentrations of CP Table IIIA constituents and any newly detected CP Table III constituents as isopleth contours or discrete concentrations if isopleth contours cannot be inferred. Areas where concentrations of constituents exceed the GWPS should be clearly delineated. Depict the boundary of the plume management zone (PMZ), if applicable;
23.	Corrective Action only	SA - Jan 21 & Jul 21	Maps and tables indicating the extent and thickness of the NAPLs both light and dense phases, if detected;

Item	Program	Reporting Frequency	Requirements
24.	Corrective Action only	SA - Jan 21 & Jul 21	Corrective Measures Implementation (CMI) Progress Report or Response Action Effectiveness Report or Response Action Completion Report to be submitted as a section of the Compliance Plan report in accordance with Provision XI.H.6., if necessary. The permittee will include a narrative summary of the status of the approved final corrective measures conducted in accordance with the approved CMI Workplan or RAP, and that the requirements of Provision XI.H.7. are being met.
25.	Corrective Action only	SA - Jan 21 & Jul 21	The permittee will include a narrative summary of the status of each Solid Waste Management Unit (SWMU) and/or Area of Concern (AOC) subject to the requirements of Permit Provision XI.H. and ICM Program for a SWMU and/or AOC which documents that the objectives of Provision XI.H.8.b. are being achieved. This summary shall be included as a section of the Compliance Plan groundwater monitoring report.
26.	PMZ	Not Applicable	A summary evaluating the effectiveness of the corrective action system in controlling migration beyond the downgradient boundary and vertical limit of the PMZ to achieve the GWPS. The summary shall include an evaluation of whether the attenuation action levels are not exceeded at their respective attenuation monitoring points pursuant to 30 TAC Sections 350.33(f)(4)(A) and 350.33(f)(4)(D)(ii), if applicable;
27.	PMZ	Not Applicable	An estimate of the percentage of the response action which has been completed within the PMZ, if applicable;
28.	PMZ	Not Applicable	An estimate in years of the additional time necessary to complete the response actions for the PMZ, if applicable;
29.	PMZ	Not Applicable	A determination whether sufficient progress is being made to achieve the selected remedy standard within a reasonable time frame given the circumstance of the affected property in the PMZ, if applicable.

Item	Program	Reporting Frequency	Requirements
30.	Facility Operations Area (FOA)	Not Applicable	The following additional reporting requirements to fulfill requirements of 30 TAC Section 350.134 and 30 TAC Section 350.135. These include but are not limited to: a. Provide an average of both lost workday injury case rates and injury incidence rates for the most recent three (3) year period compared to the most recent specific industry national average published by the Bureau of Labor Statistics. (continued on next page)

Item	Program	Reporting Frequency	Requirements
30. (contd.)	Facility Operations Area (FOA)	Not Applicable	b. Document that the worker health and safety program meets the requirements of the Occupational Safety and Health Administration (OSHA) by providing records of the OSHA compliance history or the results of the most recent audit of the health and safety programs by the OSHA or a third party certified professional industrial hygienist and safety specialist. An audit is required anytime there is a significant change to the health and safety program, or at a minimum every three (3) years, the results of which indicate the program is satisfactory c. Document a compliance history ranking of average or better for the TCEQ. d. Document the pollution prevention program that has a goal of prevention of releases of COCs to environmental media within the FOA. e. Provide a statement that the program required in 30 TAC Section 350.134(a)(7) to protect workers within the FOA from environmental media having concentrations of COCs greater than PCLs or action levels based on the health and safety program is still in effect. In addition, the permittee shall provide, for the preceding year, an updated map delineating areas where the Soil Response Action Plan has been implemented pursuant to 30 TAC Section 350.135(a)(5). f. Document there have not been any significant outstanding non_compliance issues resulting from inspections for compliance with the RCRA permit or order, if any.

Item	Program	Reporting Frequency	Requirements
30. (contd.)	Facility Operations Area (FOA)	Not Applicable	g. Document areas of ecological impact identified within the FOA and procedures for responding to these identified ecologically impacted areas on a continual basis. Review any ecologically impacted areas annually and report any new ecological impacts within thirty (30) days of verification of impact. h. Document activity associated with tracking and responding to releases to soil and groundwater above reportable quantities, which occur within the FOA after the issuance of the Compliance Plan, in accordance with 30 TAC Section 350.135(a)(7). i. Document any NAPL occurrences and any procedure(s) used to address known NAPLs and any NAPLs identified during the operational life of the FOA. This should include any previously discovered NAPL occurrences. j. Provide documentation that access is restricted to the FOA.

CP Table VIII: Compliance Schedule

Item	**Compliance Schedule** (from the date of issuance of the Compliance Plan unless otherwise specified)	**Regulatory Citation**	**Requirement**
A.	60 days	Compliance Plan	Submit to the Executive Director a schedule summarizing all activities required by the Compliance Plan. The schedule shall list the starting dates of all routine activities. The permittee shall include an updated schedule in the groundwater monitoring report required by Provision XI.G.3. and CP Table VII. The schedule shall list the activity or report, the Compliance Plan Section which requires the activity or report, and the calendar date the activity or report is to be completed or submitted (if this date can be determined.)
B.	Requirement completed on 8/1/2024	30 TAC §335.163(4) and Provision XI.F.2.	Submit to the Executive Director for review and approval a Sampling & Analysis Plan (SAP) unless the SAP has been submitted with the application and referenced in Provision I.B.
C.	Not Applicable	30 TAC §335.166	Corrective Action monitoring shall be conducted on Choose an item. basis for the RCRA-regulated units listed in CP Table I.A. which are subject to the Corrective Action Program.
D.	During the first thirty (30) days of each first and third quarter	30 TAC §335.165	Compliance Monitoring shall be conducted on a semiannual basis for the RCRA-regulated units listed in CP Table I.B. which are subject to the Compliance Monitoring Program.
E.	During the first thirty (30) days of each first and third quarter	30 TAC §335.167	Corrective Action monitoring shall be conducted on a semiannual basis for the solid waste management units (SWMUs) and/or areas of concern (AOCs) listed in CP Table I.C. which are subject to the Corrective Action Program.
F.	Not Applicable	30 TAC §335.151	Alternative Corrective Action monitoring shall be conducted on Choose an item. basis for the RCRA-regulated units, SWMUs, and/or AOCs listed in CP Table I.D. which are subject to the Corrective Action Program.

Item	**Compliance Schedule** (from the date of issuance of the Compliance Plan unless otherwise specified)	**Regulatory Citation**	**Requirement**
G.	Not Applicable	30 TAC Section 335.156 and Chapter 350	FOA Corrective Action monitoring shall be conducted on Choose an item. basis for the RCRA-regulated units, SWMUs, and/or AOCs listed in CP Table I.E., which are located within the FOA Boundary and are subject to the Corrective Action Program.
H.	Not Applicable Enter the date the requirement was completed; delete if not applicable.	30 TAC §350.31(g) and §350.33(f) (4)(C)(i)	If a plume management zone (PMZ) has been authorized, submit to the Executive Director proof of compliance with the institutional control requirements which provides notice of the existence and location of the PMZ and which prevents exposure to groundwater from this zone until such a time when the concentrations of the chemicals of concern are less than the groundwater protection standards (GWPS) listed on CP Table III.
I.	Not Applicable	30 TAC §350.33(k)	If a PMZ has been authorized, after an unexpected event occurs which indicates that additional response actions will be required at an affected property.
J.			.

Notes:

1. Please note that Corrective Action monitoring is conducted on semiannual basis unless a less frequent monitoring schedule is approved based on plume stability and achievement of Corrective Action objectives.

corrective action objectives.

[2]Note: Add other site specific activities listed in the implementation schedule of the application that are not completed at the time of application submittal or issuance of the final draft compliance plan. Otherwise, delete requirement if no additional items necessary}. Some common examples are listed below..*

Example (PMZ-specific items that haven't been completed):

Within sixty (60) days of issuance of the Compliance Plan (or other specified time frame), the Permittee shall submit a schedule for completion of the following activities:

Designation/establishment of Attenuation Monitoring Point (AMP) well locations, AMP-xx, AMP-xx that provides appropriate hydraulically upgradient location within the groundwater protective concentration level exceedance (PLCE) zone and continuing down the approximate central flow path of the constituent of concern (COC in the downgradient extent of (unit/area) in accordance with 30 TAC Section 350.33(f)(4)(D).

Establishment/calculate Attenuation Action Levels (AALs) for AMP, AMP-xx, AMP-xx, in accordance with 30 TAC Section 350.33(f)(4)(D)(ii).

Example (installation of additional monitor wells):

Within sixty (60) days of issuance of the Compliance Plan (or other specified time frame), the Permittee shall submit a schedule for completion of the following activities:

The installation of additional wells MW-xx, MW-xx, POE-xx, etc., as depicting in CP Attachment A-monitor well location map. All newly installed wells must meet the requirements of XI.C and CP Attachment C.

CP Table IX: Description of Uppermost Aquifer

The term “Uppermost Aquifer” as referenced in this Compliance Plan refers to the: Transmissive Saturated Zone of the Ogallala Aquifer which is comprised of two parts, the upper saturated sands and the lower basal gravels.

· Ogallala Formation Upper Sands – Lower Pliocene age with facility-wide thickness range (197 wells fully penetrating) of 10 to 154-feet (facility average of 89.8-feet). Fluviatile sand with isolated, minor mixtures of silt, clay and gravel capped by caliche. The Sand ranges from fine to medium grained quartz while in some areas it contains silt and/or is more calcareous or clayey in upper part, 1/8-inch clay balls, indistinctly bedded in massive crossbeds, unconsolidated to weakly cohesive, local quartzite lenses, reddish pink. Gravel in isolated areas, mostly quartz, and some quartzite in transformational channel deposits. Contains the upper saturated transmissive zone.
Upper Saturated Sands:
BICA Area Top Saturation Min / Max / Avg in feet below grade = 4.0 / 120.0 / 74.1
BICA Area Top Saturation Min / Max / Avg in feet-Mean Sea Level = 2363.6 / 2418.0 / 2389.0 BICA Area Thickness Min / Max / Avg in feet = 20.0 / 59.0 / 37.1
Site E Top Saturation Min / Max / Avg in feet below grade = 80.0 / 96.0 / 88.8
Site E Top Saturation Min / Max / Avg in feet-Mean Sea Level = 2389.1 / 2402.9 / 2397.3
Site E Thickness Min / Max / Avg in feet = 20.0 / 59.0 / 37.1

· Ogallala Formation Basal Gravels – Fluviatile gravels with facility-wide thickness range (175 wells fully penetrating) of 0 to 49-feet (facility average of 10.6-feet), consisting mostly of limestone and chert with caliche and siliceous pebbles, gravel, and cobbles. Gravels are non-cohesive and loose with little to no inter-granular cementation. Minor, intermixed sand and silt mostly brown and red grains of silica and calcium carbonate. Along an east-west axis, the basal gravels are missing due to high energy paleo-erosional processes, which removed an estimated 1,500-feet of sediment during the Cretaceous Period. This area of missing unit is primarily located along and north of IH-20.

Basal Saturated Gravels:
BICA Area Min / Max / Avg in feet below grade = 20.0 / 150.0 / 101.7
BICA Area Min / Max / Avg in feet-Mean Sea Level = 2344.0 / 2379.0 /2361.5 BICA Area Thickness Min / Max / Avg in feet = 3.0 / 28.0 / 9.6
Site E Min / Max / Avg in feet below grade = 99.0 / 110.0 / 105.9
Site E Min / Max / Avg in feet-Mean Sea Level = 2369.1 / 2387.4 / 2380.2
Site E Thickness Min / Max / Avg in feet = 19.5 / 34.0 / 26.8

Alon USA, LP
Alon USA Big Spring Refinery – Big Spring, TX

Hazardous Waste Permit 50140
Part B Application
SWR No. 30083 / RN100250869 / CN600881783

SECTION XII
HAZARDOUS WASTE PERMIT APPLICATION FEE TABLES

Alon USA, LP
Alon USA Big Spring Refinery

Hazardous Waste Permit 50140
Part B Application
SWR No. 30083 / RN100250869 / CN600881783

APPENDIX XII
APPLICATION RESPONSES
Hazardous Waste Permit Application
Fee Tables

Table XII.A. - Hazardous Waste Units (For Application Fee Calculations)

Verbal Description of Unit	Rated Capacity	Surface Acreage[1]	# of Unit Types[2]	Identical Unit Justification[3]
Container Storage Area CSA-A CSA-B CSA-C	400 drums	0.9	1	CSA-A, B, C are utilized the same and are within the same fenced unit area
Closed Land Treatment Units SITE E SITE H	1,180,000,000 lbs	13.09	1	Siter E and Site H are both closed LTUs. Site H replaced Site E when it was closed
		Total[4] 13.99	Total[4] 2	

1. Number of calculated acres.
2. Enter number of units except for units identical in type and use which only count toward a single $500.00 fee.
3. Explain justification for any units claimed as identical in type and use.
4. Enter these totals on the worksheet.

Table XII.B. - Hazardous Waste Permit Application Fee Worksheet

Name of Facility: ALON USA LP

Solid Waste Registration Number: SWR 30083

1. Process Analysis - $1,000	$	1000
2. Facility Management Analysis - $500	$	500
3. Unit Analysis - 2 units @ $500 per unit	$	1000
4. Site Evaluation - 13.99 acres @ $100 per acre (Maximum of 300 acres)	$	1399
5. Minor amendment, Class 1, or Class 1[1] modification - $100	$	0
6. Cost of Providing Notice - $50 (+ $15 for a renewal)	$	65

Pay This Amount **Total** $3,964.00

Make Checks Payable To:

Texas Commission on Environmental Quality - Fund 549 *(your canceled check will be your receipt)*

Complete And Return With Payment To:

Texas Commission on Environmental
Quality Financial Administration Division -
MC 214 P.O. BOX 13088
Austin, Texas 78711-3088

The applicant's fees are subject to evaluation by the technical staff of the Texas Commission on Environmental Quality (TCEQ). However, the TCEQ reserves the right to assess further fees as may be necessitated.

Please do not submit a photocopy of the check (or equivalent transaction submittal) with your application packet but provide only the following account information:

Check No.	Date of Check	Check Amount

Your transaction is complete. Thank you for using TCEQ ePay.

Note: It may take up to 3 working days for this electronic payment to be processed and be reflected in the TCEQ ePay system. Print this receipt and the vouchers for your records. An email receipt has also been sent.

Transaction Information

Trace Number: [redacted]
Date: 07/24/2024 03:01 PM
Payment Method: CC - Authorization [redacted]
ePay Actor: ROBERT SHERRILL
Actor Email: [redacted]
IP: 168.149.243.41
TCEQ Amount: $4,029.00
Texas.gov Price: $4,119.91*

* This service is provided by Texas.gov, the official website of Texas. The price of this service includes funds that support the ongoing operations and enhancements of Texas.gov, which is provided by a third party in partnership with the State.

Payment Contact Information

Name: ROBERT SHERRILL
Company: ATLAS TECHNICAL CONSULTANT LLC
Address: 212 TWIN CREEK CIR, DRIPPING SPRINGS, TX 78620
Phone: 512-470-8710

Cart Items

Click on the voucher number to see the voucher details.

Voucher	Fee Description	AR Number	Amount
714332	HAZARDOUS WASTE PERMIT - RENEWAL		$3,964.00
714333	30 TAC 305.53B HWP NOTIFICATION FEE		$50.00
714334	30 TAC 305.53B HWP RENEWAL NOTIFICATION FEE		$15.00
		TCEQ Amount:	$4,029.00

ePay Again Exit ePay

Note: It may take up to 3 working days for this electronic payment to be processed and be reflected in the TCEQ ePay system. Print this receipt for your records.

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Alon USA, LP
Alon USA Big Spring Refinery
Big Spring, TX

Hazardous Waste Permit 50140
Part B Application
SWR No. 30083 /RN100250869 /
CN600881783

SECTION XIII

CONFIDENTIAL MATERIAL

No Confidential Material included